TECHNOLOGY DEPARTMENT

Gas Journal

Vol. 254. 100th Year. LONDON, APRIL 28, 1948. No. 4430. Price 1/-

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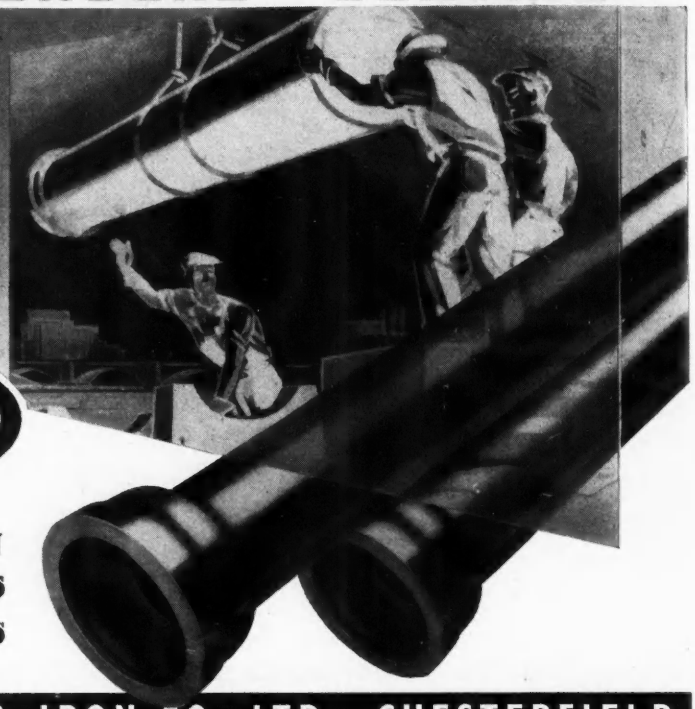
FOR UNDERGROUND SERVICE

No easy task laying sound plans for water, gas and sewage services for a new or growing community. The new schemes have so often to be combined with the old—it calls for ingenuity and sound engineering—it calls, too, for pipes of quality—Staveley spun pipes and the "specials" that go with them—There's a department at Staveley specially to help in devising economical and efficient pipe layouts—why not make use of it?



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CAST IRON PIPES
FLEXIBLE JOINTS & SPECIALS

THE STAVELEY COAL & IRON CO. LTD., CHESTERFIELD

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GAS SERVICE GOVERNORS

This is an angle type Governor with horizontal inlet and bottom outlet. Can be supplied with ¾" or 1" inlet and the outlet fitted with union and nut suitable for connecting to the inlet of a meter with either 5- or 10-light connections. Can also be arranged for horizontal outlet.

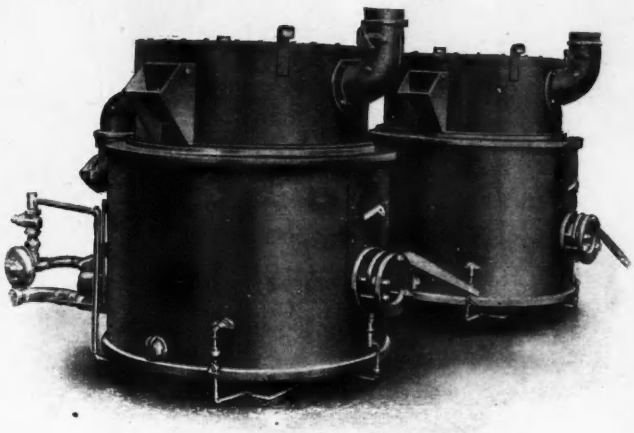
Suitable for Inlet Pressure up to 22" w.g., but can be made for higher pressures if required. The Governor is set for 2·8" Outlet Pressure, but can be weighted to give higher pressures if desired. Capacity—300 cu. ft. per hr., with a pressure loss of less than ½" w.g.

This Diaphragm Governor has been developed to meet conditions which will be generally found in the new houses now being erected. It will prevent excessive consumption of gas by maintaining a uniform pressure under all conditions.

THE BRYAN DONKIN COMPANY LTD.

Gas Works Plant Engineers, CHESTERFIELD

Soft Metal Melting Furnaces



The melting of Soft Metal Alloys is essentially one of relatively low temperature but requires a fast heat input to obtain maximum production.

This heating must be well distributed to avoid hot spots which reduce pot life.

This problem of heat balance has been carefully worked out in our Soft Metal Melting Furnaces.

For fast and economical melting with low maintenance

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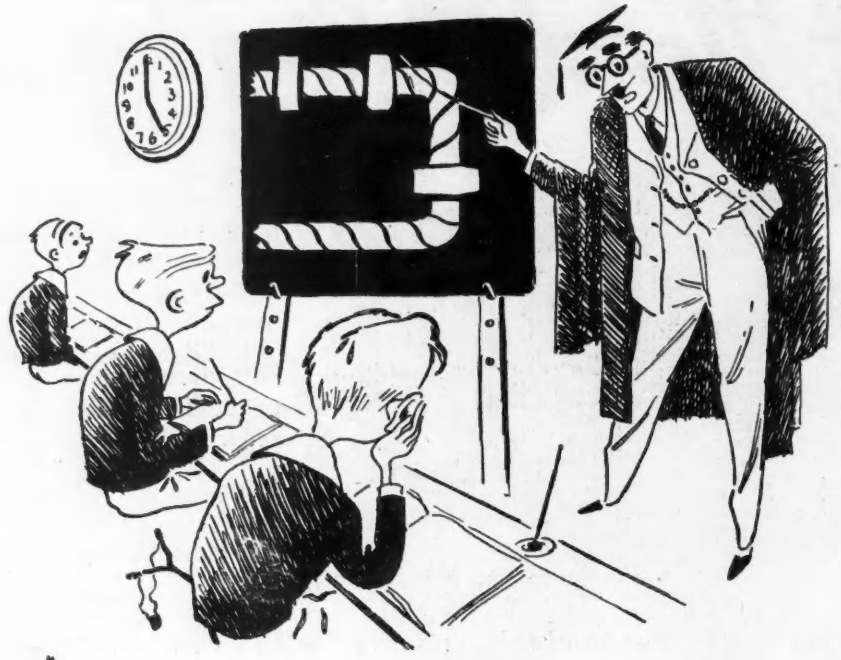

HEAT CAN BE KEPT IN TOO!

Heat's natural instinct is to go out to play from all surfaces which store or convey it. Few people realise that if a 1" steam pipe with a surface temperature of 200° C is unlagged for 20 ft., the heat lost by radiation and convection may waste nearly half a hundredweight of coal in the course of a working week.

Most likely your heated surfaces *are* lagged. But are they all lagged *efficiently?* Are regular checks carried out to ensure that insulating material is in good condition everywhere—including that dark corner where the pipes can't be reached without a ladder? Is the thickness of the material sufficient for the temperature of the surface it covers? Are you sure that flanges and valve bodies have not been left naked to make maintenance easy? The heat loss from a bare flange may be as much as that from a foot or more of bare pipe.

Proper lagging of boilers, cylinders, steam pipes and other heated surfaces pays the highest dividends in fuel efficiency for very little capital expenditure. Fuel Efficiency Bulletin No. 2 published by the Ministry of Fuel and Power is a little mine of information concerning this. The Ministry's Regional Office will gladly send you a copy if yours has gone astray.

YOUR REGIONAL FUEL OFFICE

REGION	ADDRESS	TELEPHONE
Northern	Government Buildings, Ponteland Road, Newcastle-on-Tyne, 5	Newcastle 28131
North-Eastern	Century House, South Parade, Leeds, 1	Leeds 30611
North-Midland	Castle Gate House, Castle Gate, Nottingham	Nottingham 46216
Eastern	Shaftesbury Road, Brooklands Avenue, Cambridge	Cambridge 56268
London	Mill House, 87/89, Shaftesbury Avenue, W.1	Gerrard 9700
South-Eastern	95, High Street, Rochester	Chatham 3487
Southern	Whiteknights, Earley, Reading	Reading 61491
Wales	27, Newport Road, Cardiff	Cardiff 9234
South-Western	12/14, Apsley Road, Clifton, Bristol, 8	Bristol 38223
Midland	Temporary Office Buildings, Hagley Road West, Birmingham, 17	Bearwood 3071
North-Western	Burton Road, West Didsbury, Manchester, 20	Didsbury 5180-4
Scotland	145, St. Vincent Street, Glasgow, C.2	Glasgow City 7636
Scotland	51, Cockburn Street, Edinburgh, 1	Edinburgh 24081
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CARBON: AN ENGINEERS' MATERIAL

KINDLY tick your requirements on this abridged list of attributes.

PHYSICAL.
RESISTANCE TO:—heat: thermal shock: acids: corrosive salts: caustic alkalis.
IMPERVIOUS:—yes, no.
THERMAL CONDUCTIVITY:—high: low.
RETENTION AT HIGH TEMPERATURE OF:—shape: strength.
ABSENCE OF:— odour: taste.

ELECTRICAL.
CONDUCTIVITY:— high: low.
PRESSURE SENSITIVITY: contact resistance varied by mechanical pressure.

MECHANICAL.
BEARING QUALITIES:— unlubricated: lubricated with water: strong chemicals (state which).
FRICTIONAL COEFFICIENT:—high: low.
CHIEF CONSIDERATION:—quietness or load capacity.
TOLERANCES: . . . . . .

GENERAL.
Qualities include high thermal radiation, low reversible coefficient of expansion, absence of wetting by molten glass or metal, absence of seizure, and non-melting at any temperature.

UNTIL 'MORGANITE' CARBON WAS TRIED for the above part, no material had given satisfaction, for the qualities demanded were a rare combination of those listed on the right, and not to be found in other materials commercially available.

Carbon solved the problem, as it may solve some of yours. May we suggest that you send us particulars of any difficult duties which are not being met in an efficient or economic manner with your present materials?

It would be of assistance if you would send this page to us, ticking on the list the properties required to meet the conditions, and—if you care to—a print of the troublesome part.

Gas meter valves and valve facings made of Morganite carbon are self-lubricating and impart to the metal counterface a graphitic film which protects it from chemical action. They are completely inert to the solvents in gas and are non-hygroscopic. Their inertia is low. Morganite carbon valves and valve facings are made in large and small sizes.

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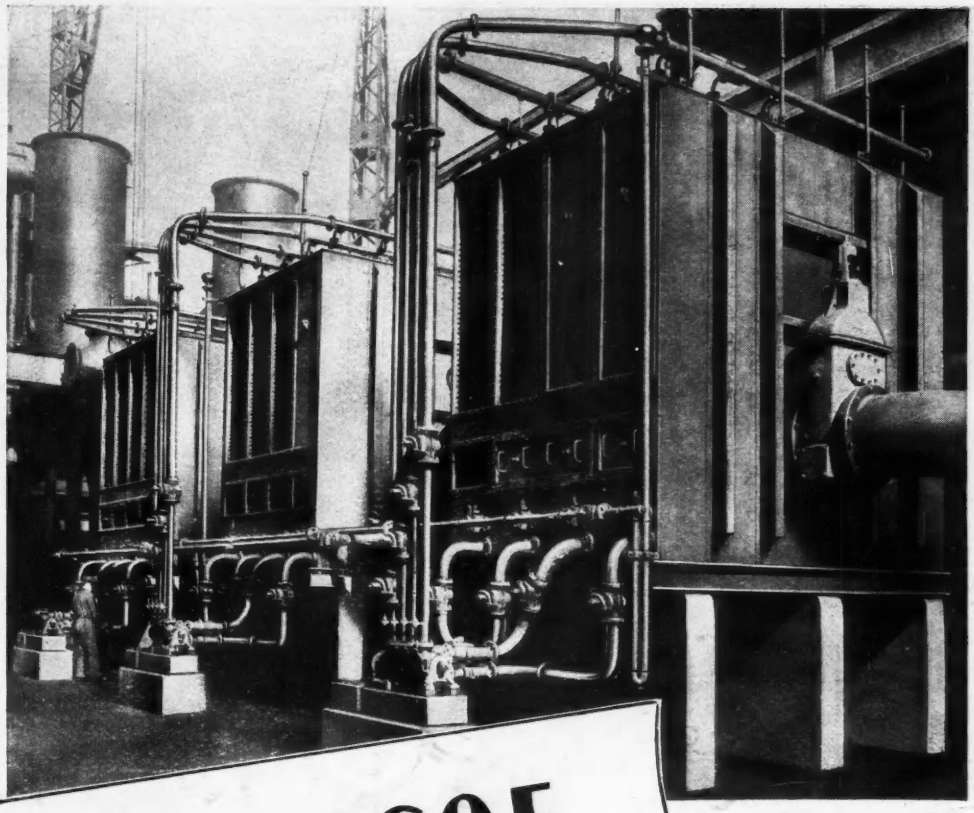

Constructional view of a large capacity 12 bay Whessoe Static Scrubber for ammonia extraction, supplied to the South Metropolitan Gas Company.

THE WHESSOE MULTI-STAGE STATIC SCRUBBER

FEATURES

1. **Wooden grid filling, providing a washing surface with a high degree of sub-division and uniformity.**
2. **Adequate irrigation of this filling by means of high efficiency mono-bloc centrifugal pumps, providing the simplest and most reliable method of liquid recirculation.**
3. **Guaranteed performance, not merely of ammonia or naphthalene removal, but of corresponding enrichment of washing medium.**

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GENERAL GAS APPLIANCES LTD. AUDENSHAW MANCHESTER

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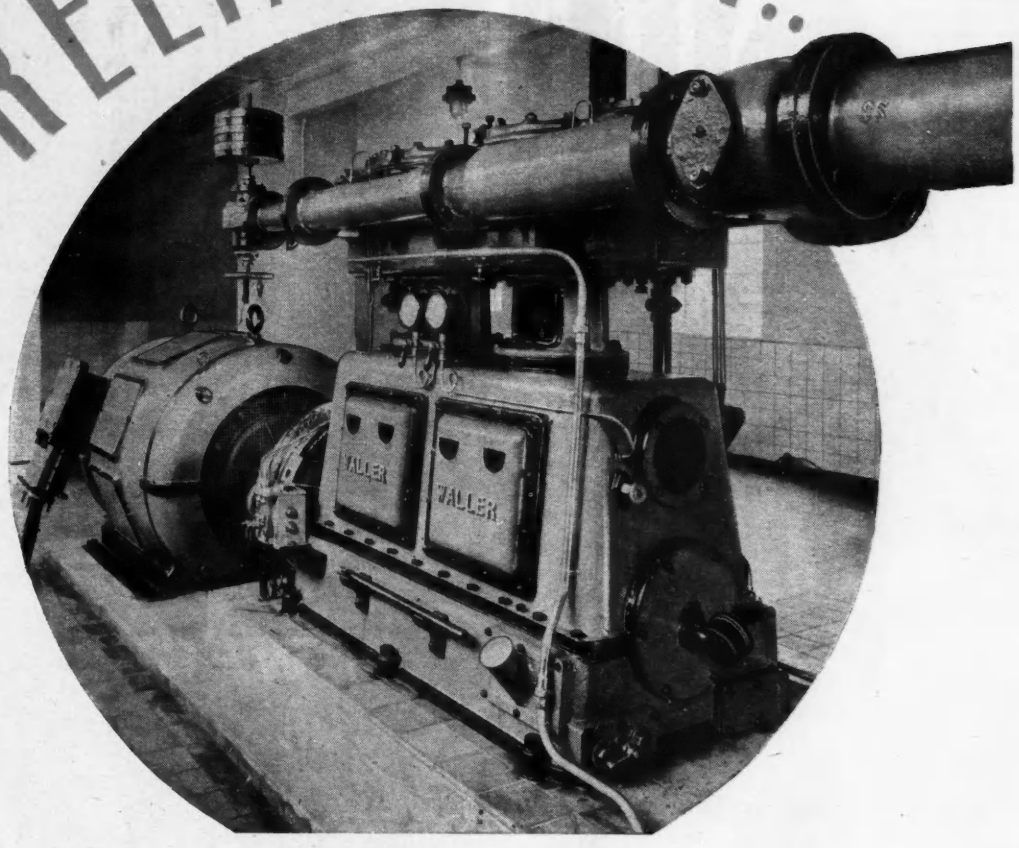

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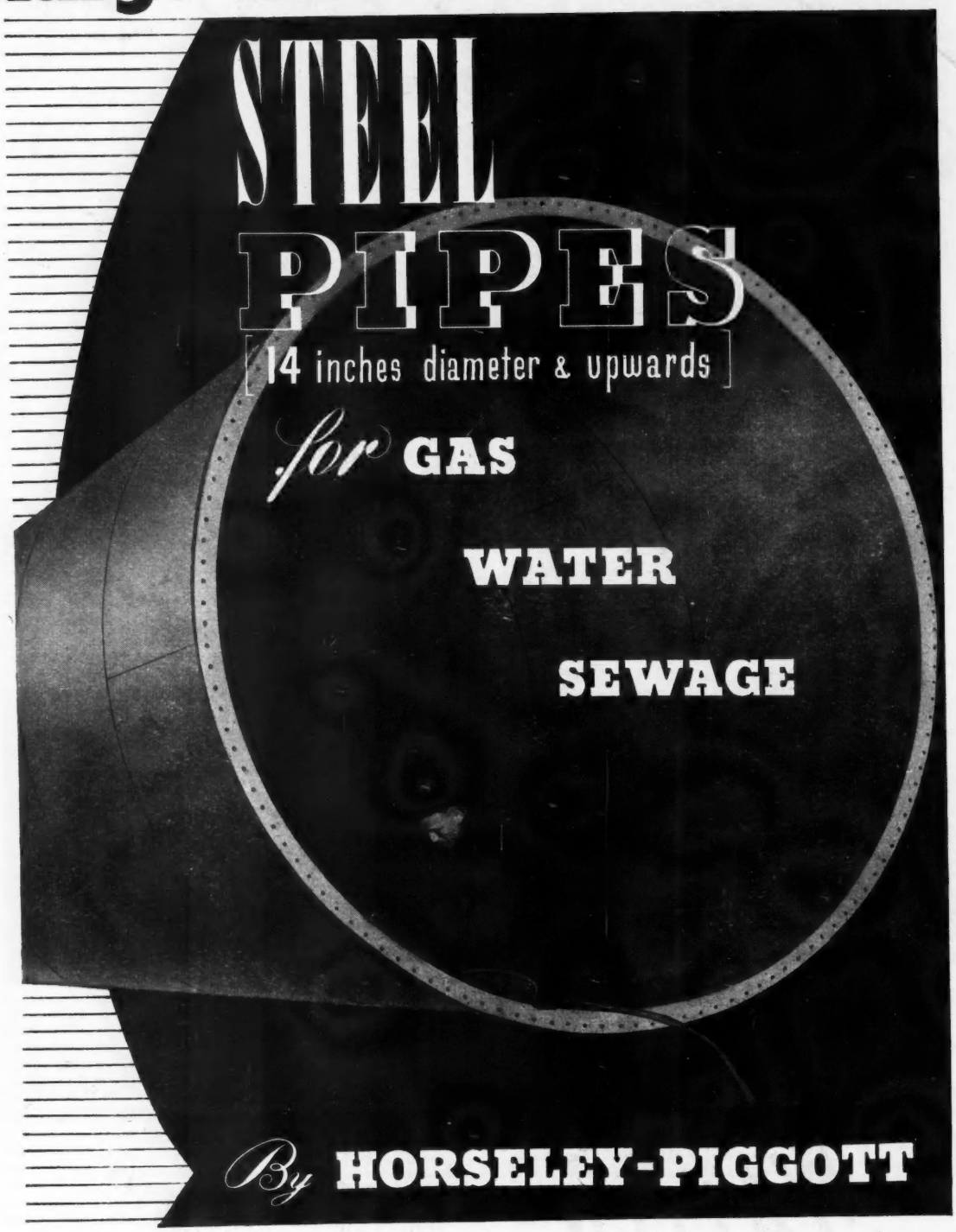

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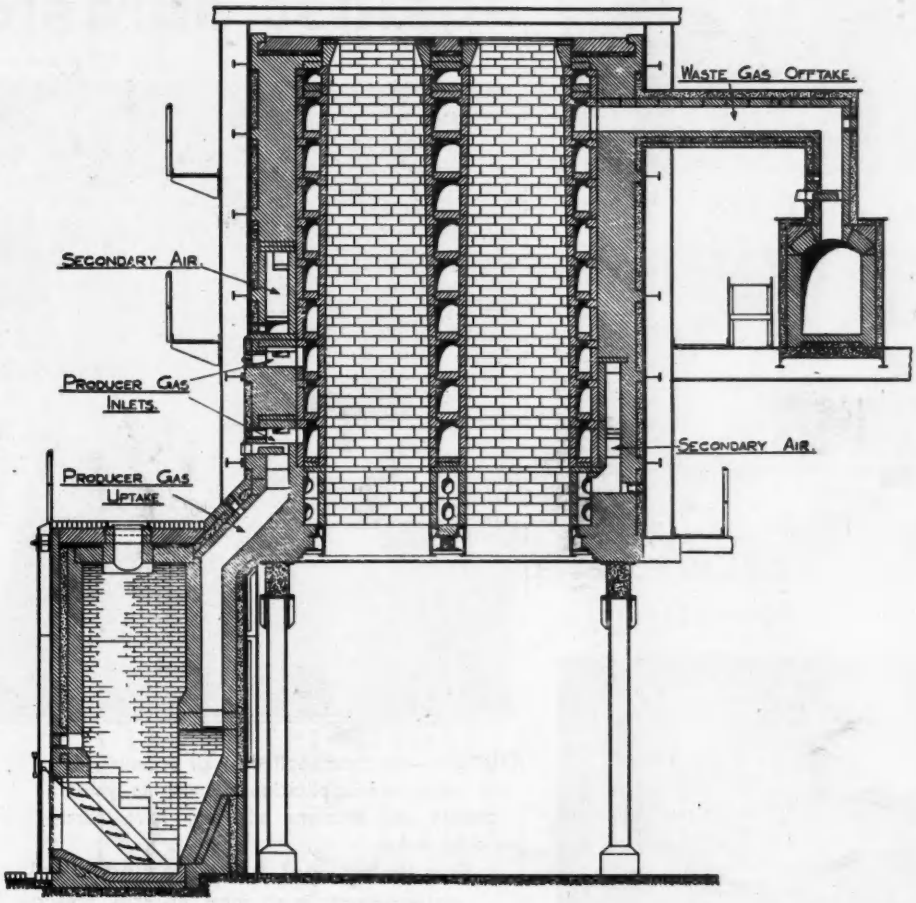

No 1 The illustration shows a cross section of Drakes Patented Upward Draughted Vertical Retort Setting. The Settings may be arranged in Beds to contain one to eight Retorts and nested in units of 1, 2 or 4 Retorts; each unit being provided with its own Controls for the supply of Secondary Air and Producer Gas.

With Drakes system of draughting, the heating zone in the length of the Retort can be readily controlled to suit the class of coals used and the calorific value required.

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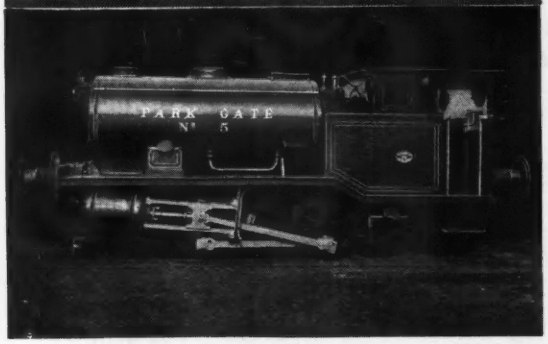
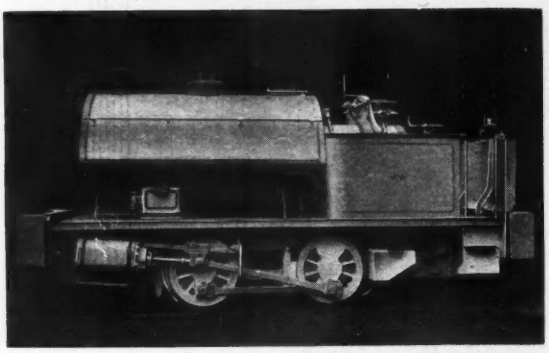


However unusual your



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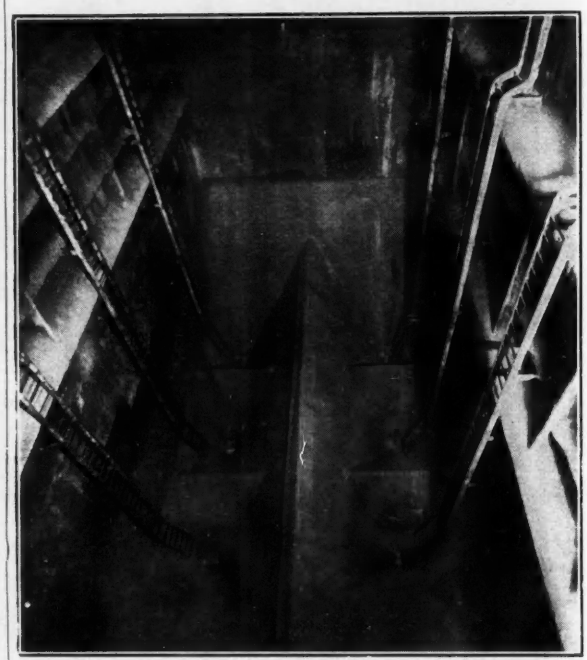

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have particular value.

For lining coal bunkers and steel chimneys it is an ideal material, possessing great resistance to corrosion and protecting steel-work from the abrasive action of the raw coal.

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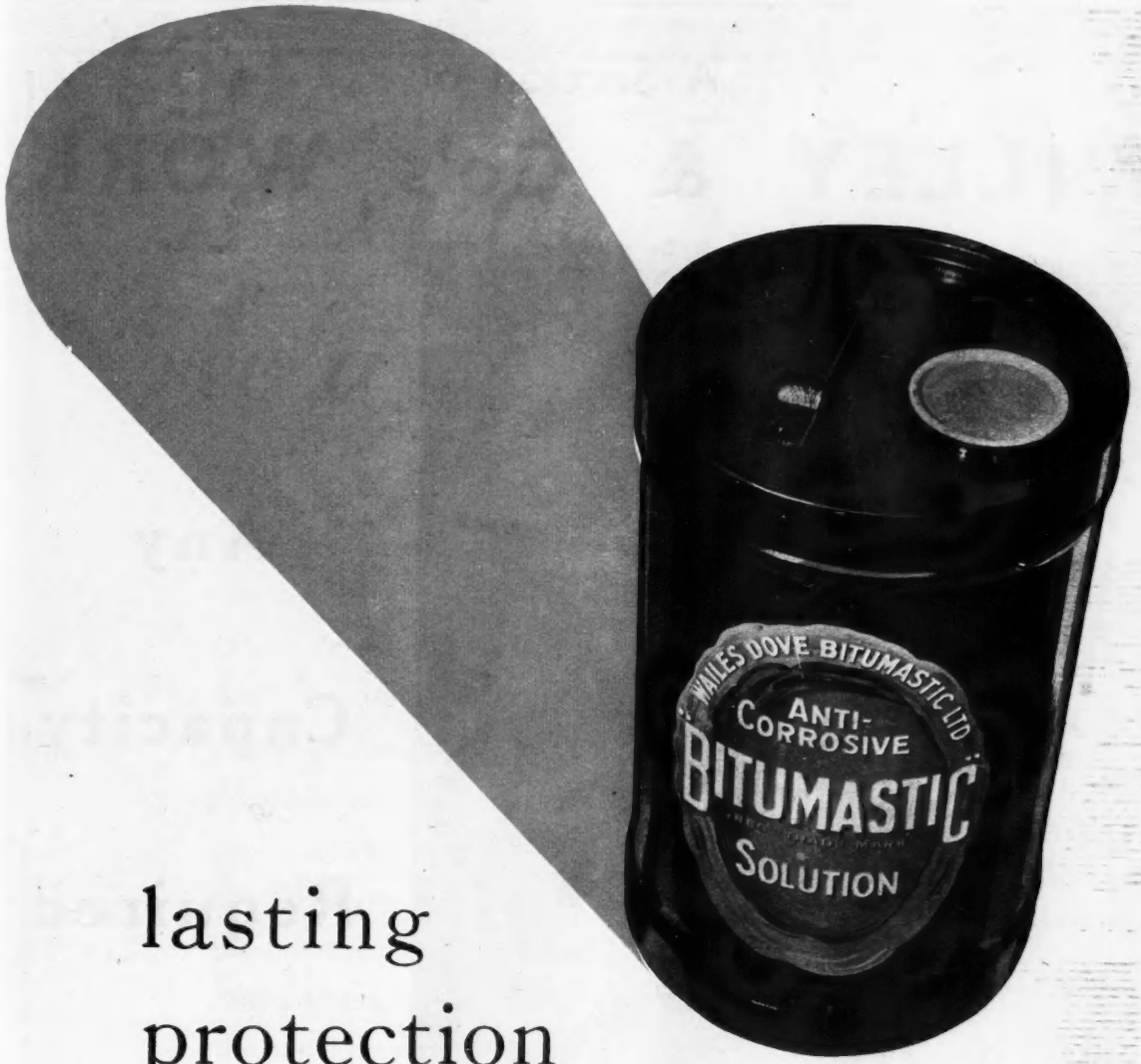

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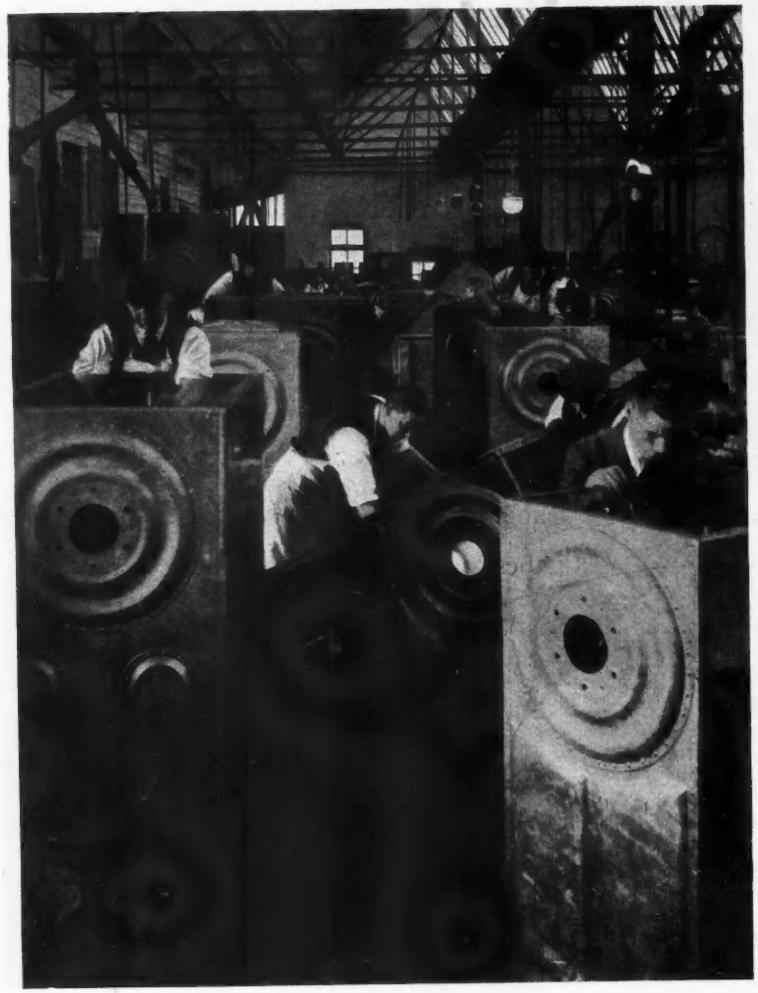

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Before analysis and scientific treatment of boiler feed water became the almost standard practice it is today, the idea that scale protected metal from corrosion was often reflected in the words 'I like to see a bit of scale'. Scale is—and always was—a potential danger. It causes the hot spots that can lead to burnt out tubes. A boiler starts life with clean tubes and drums; phosphate conditioning of the feed water will maintain that scale-free condition. Albright & Wilson have produced a technical booklet, 'Phosphates for Boiler Water Conditioning', which gives full information on this important aspect of boiler operation and anyone interested in the subject is invited to write for a copy.

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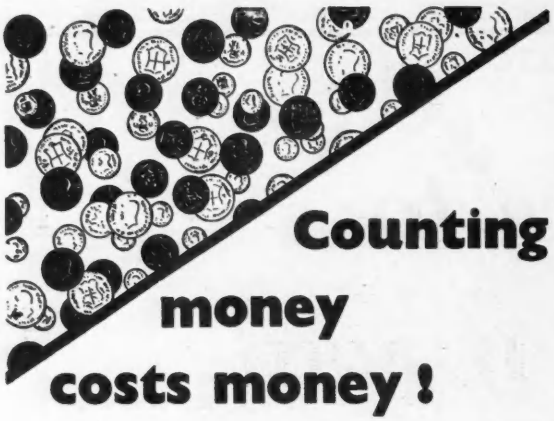

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Any business that has to handle and count large quantities of mixed coinage and does it by hand is wasting more man-hours than business can afford today. Precious man-hours too, because the job must be done by responsible (meaning well-paid) workers. And even so, it's human to err!... Instal an I.C.C. coin-counting machine, switch on, and do the job at high speed with absolute accuracy. A typical machine sorts, counts and records £100 of mixed coinage in five minutes and the youngest office-girl can work it. We'll be glad to arrange a demonstration in your own office.

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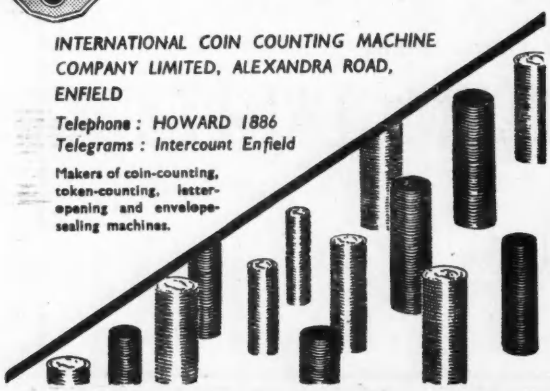
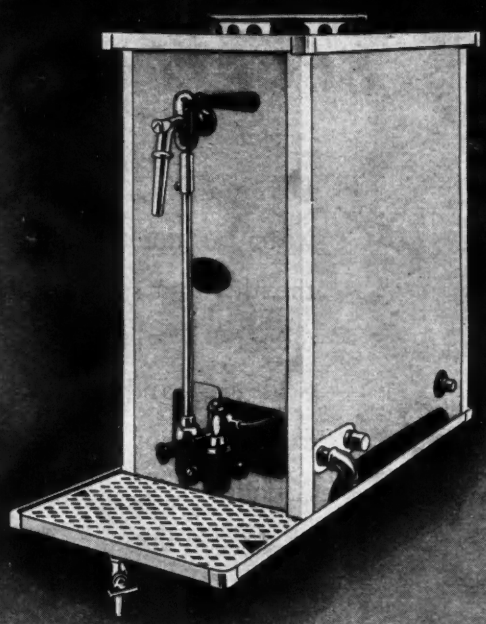


THE MOST ADVANCED GAS HEATED WATER BOILER



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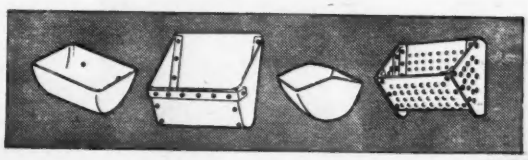

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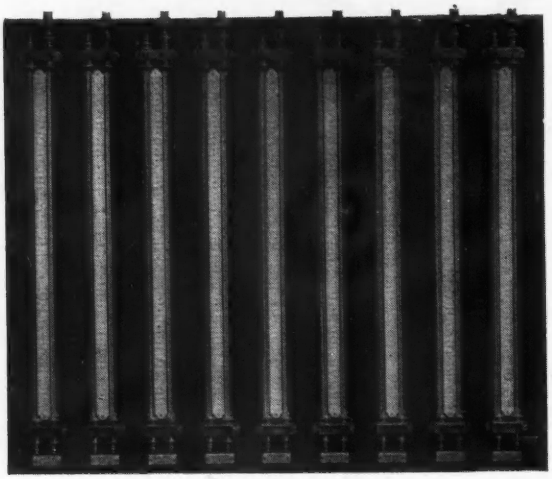

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Gauges by Grant of Edinburgh

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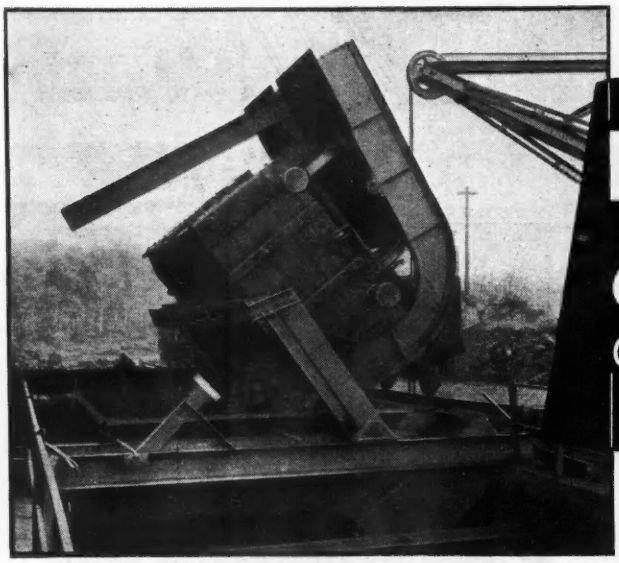

Side Discharge Wagon Tippler handling 12 ton Wagons (S. & H. System).

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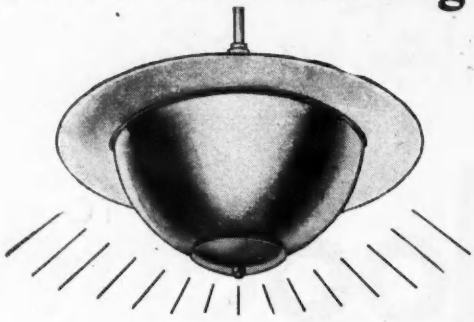
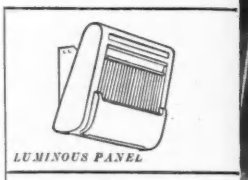
Overhead Radiant Heating by gas

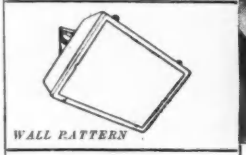


Like the sun, Bratt Colbran Overhead Radiant Heaters radiate their heat *downwards*, providing a comfortable temperature that is invigorating and free from stuffiness. They are also: ECONOMICAL —they direct unobstructed heat *where* it is wanted and only *when* it is wanted. QUICK IN ACTION —they can be switched on and off instantly under individual, grouped or thermostatic control. EFFECTIVE — they give evenly distributed heat, comfortable at any distance, and independent of the general temperature of the building or of currents of air (particularly valuable where general thermal insulation is impracticable). SAFE — they are out of reach of accidental contact. SPACE-SAVING — they can be suspended from roof, wall or cross-beam. CONVENIENT — they can be installed quickly and economically, without interfering with the use of the building. SIMPLE — once installed, they are good for years with minimum maintenance.

There are four designs of Overhead Radiant Heater: the Bowl Heater (above), the Luminous Panel, the Wall, and Wedge Heaters (shown below). All are noiseless and each has its own special advantages. Between them they solve the heating problems for a wide range of new and existing buildings: factories, workshops, churches, public halls, schools, restaurants, shops, stores, offices.



LUMINOUS PANEL



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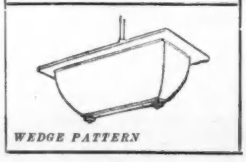

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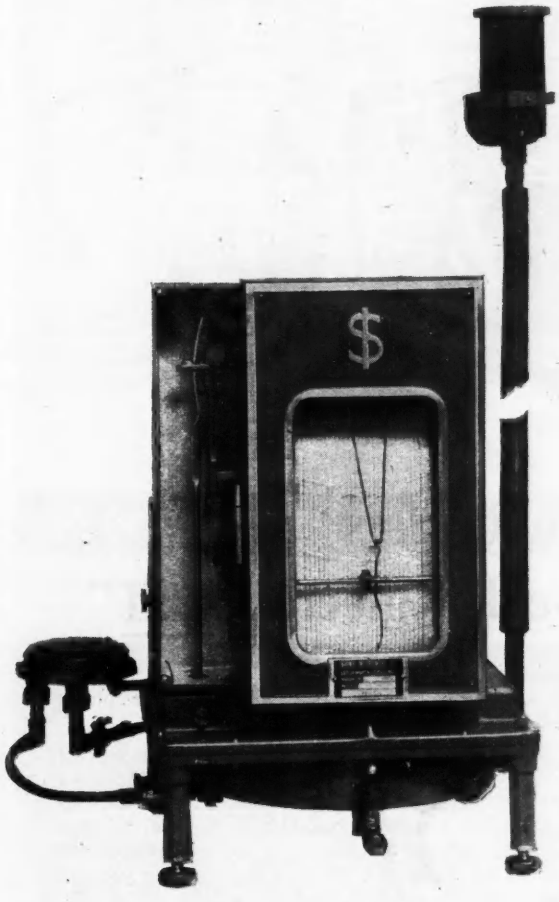

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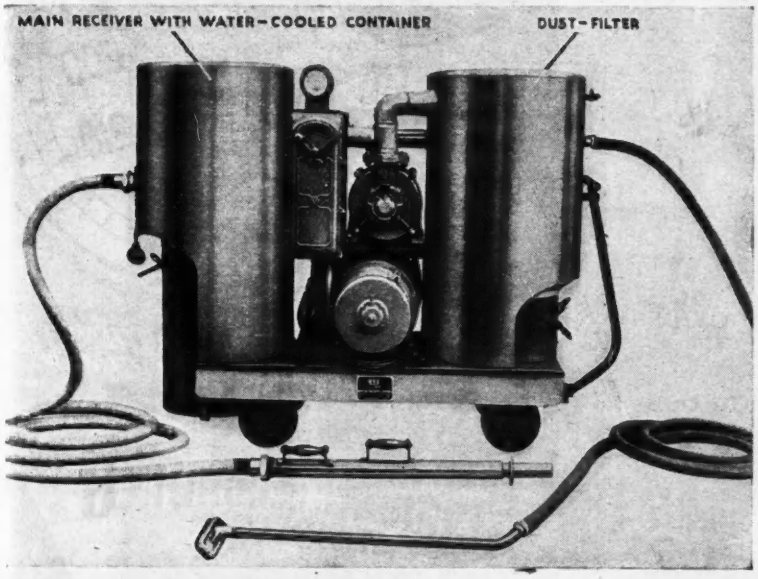

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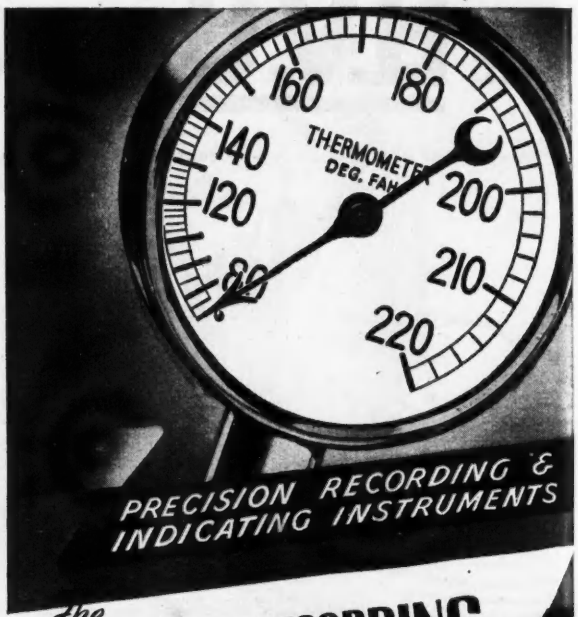

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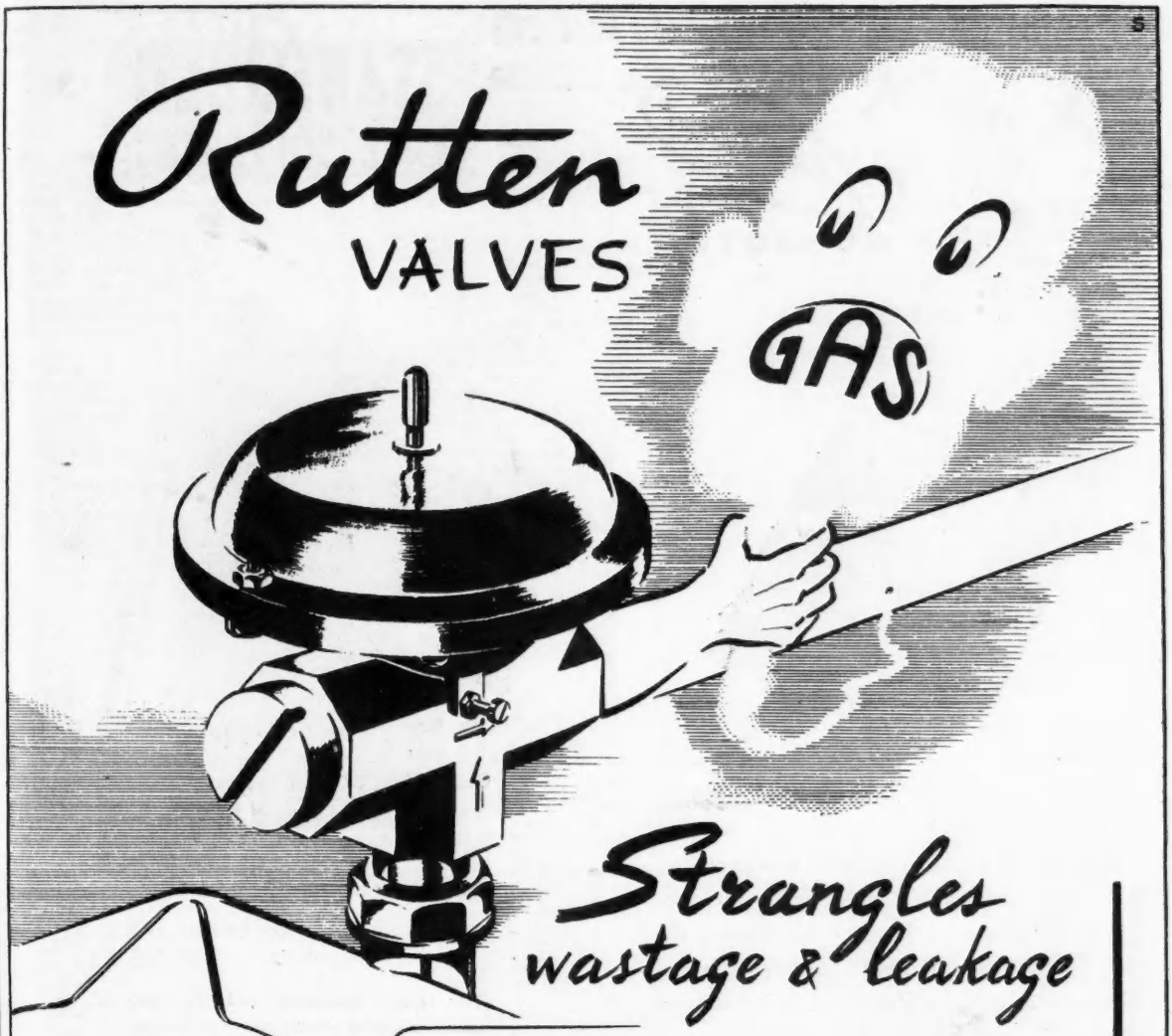

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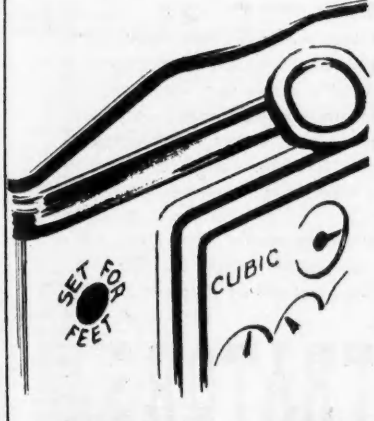

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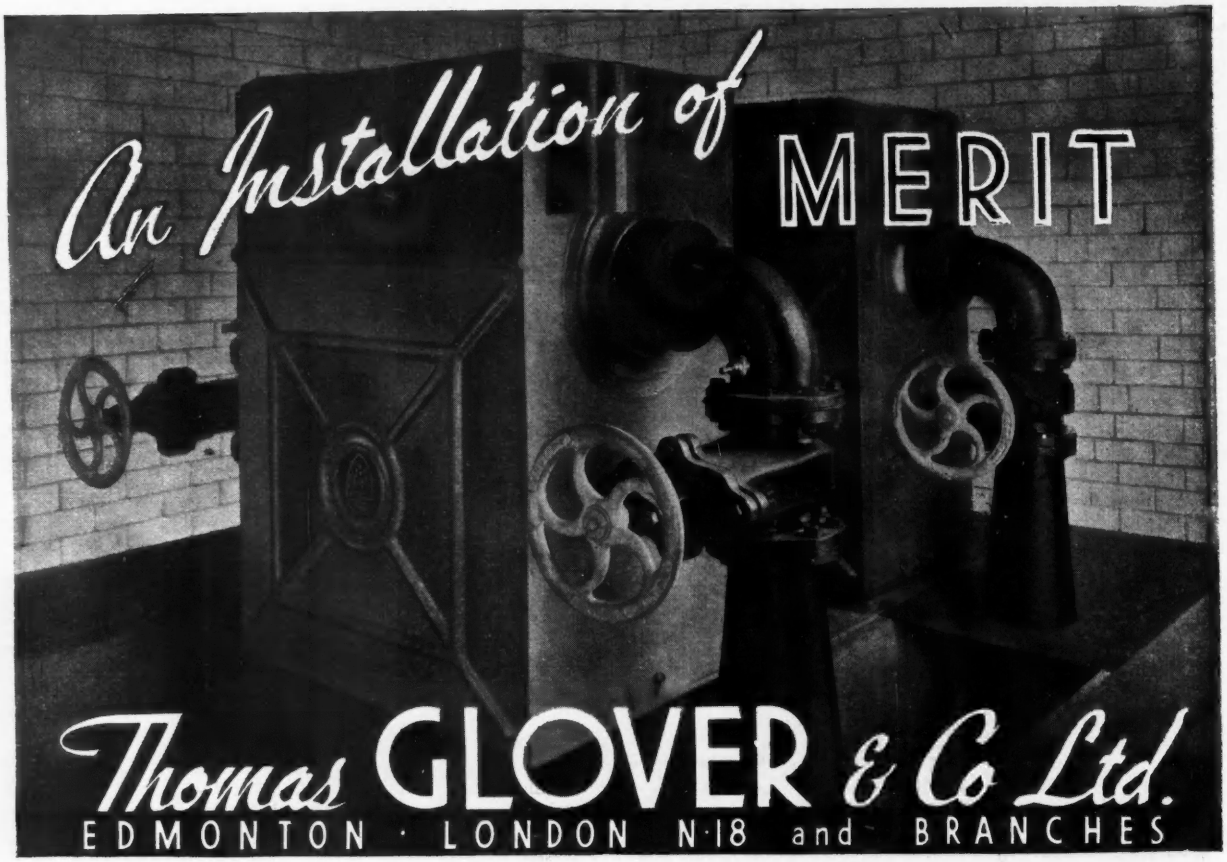

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Vol. 254 April 28, 1948 No. 4430

OXIDE PURIFICATION

THE paper given by Mr. G. U. Hopton to the Eastern District of the Southern Association of Gas Engineers and Managers is outstanding for two main reasons. It is a comprehensive treatment of the whole subject—yet another of those magnificent pieces of specialized investigation the results of which are so freely put at the disposal of the whole industry by the Gas Light and Coke Company—and it exhibits overwhelming evidence of striking advance in this old-established process. It is so often thrown up at the gas industry that it clings to an out-moded method of hydrogen sulphide removal from crude gas that it is very refreshing to read that there are methods, some already proved, others in the process of active development, by means of which the process may be in the near future enormously speeded up with concomitant reduction of space occupied by the plant and cost of purification per therm.

The difficulty with the use of any naturally occurring material such as bog-ore—there is the same difficulty with coal itself—is that its composition may be so complex, and so liable to vary as between one part of the deposit and another, that it demands constant vigilance in "control" to make certain that you are always getting what you think you are getting. The new materials described by Mr. Hopton—nodules of definitely limited size, prepared in known ways from known substances—will not only have the advantage that the process is speeded up 20- or 30-fold, but they will endow the process with a certainty which has been irritatingly absent with the older, orthodox materials. True, the new materials appear to be more costly, sources of supply may need watching, the crude gas needs more careful treatment, and temperature control will have to be more accurate ; but if they hold the promise of the improvements suggested with a cost of material not more than 0.02d. per therm, the possibilities are decidedly well worth exploring with energy and with the determination to bring them into use.

The evaluation of purifying material has for long engaged the attention and exercized the ingenuity of the gas-works chemist. The difficulty lies in devising a test which shall simulate the conditions of working with their complex interactions between the incoming gas and the partially fouled oxide. Mr. Hopton put forward his recommendations, but these he qualified with the wise remark that all such laboratory tests must be combined with observation of the behaviour of the material in practice. "In this way, and in this way only, can . . . the choice of oxides be placed on a scientific basis." And surely the same is true of the analysis of other materials, raw and otherwise, used in the manufacture of town gas.

The designer of purifier sets is faced with a problem which can only be solved by appeal to experience. The elements of the problem would appear to be the H_2S content of the gas and the activity and/or capacity of the purifying material. But these vary so widely that he must have recourse to empirical formulæ of which that fixing the R ratio of the set, cubic feet of gas per hour passing per cubic foot of oxide in the first box, appears to be the most useful, at any rate for a start. This figure may be 20 or 30, but what will it be if the new materials come into practical use? And what would be the effect of "split flow," as in the tower purifier, which Mr. Hopton so interestingly suggested?

And then Mr. Hopton went on to an exhaustive treatment of the operation and control of purifiers. Every single aspect and point appears to be treated—water content, air admission, humidification, temperature control, rotation working, all are examined with interesting asides on the technical and scientific bearing of each on the process. The works engineer will be interested in none more than that of the caking problem with its repercussion on labour troubles. Here again the number of variables in working conditions is so large that the problem seems to defy complete solution. "Theories are being examined in the laboratory and on the works." In the meantime it is suggested that material should be kept as open as possible in texture, fluctuations in temperature and moisture should be controlled and minimized, "boxes swung regularly and frequently."

This is indeed a paper to be read and re-read and to file for reference in times of trouble as well as to watch the progress which is yet to be made in this most important step in the preparation of town gas for the consumer.

It was clear from the excellent discussion evoked by Mr. Hopton's paper that the practical gas-works manager is still most concerned with the labour problems arising out of the caking of the oxide in the boxes. The work of emptying boxes is too often carried out by more or less casual labour and the men object both to the arduous nature of the work, even when assisted by mechanical picks, and to the evil smell of the material to be removed. A great authority with whom we talked about this paper suggests that the latter can be obviated by more care in the washing of the gas. Presumably the electric detarrer will help in this direction. But the cause and cure of the former are still obscure. It may be that some manipulation of the proportions of new and spent, or partly spent, oxide in the filling will go a long way to prevent caking. At any rate we are informed that this method is receiving the attention of those engaged in the investigations now going forward in the healthy collaboration referred to by Dr. Hollings. There are evidently several other lines of attack too, and some successes to be recorded. Mr. Muir Wilson, for instance, was able to say that hard boxes were practically unknown in the works of his great Company. They rotated their boxes backwards, bringing the last box into the first position, they admitted air to the box in the second position

only, and they went to great lengths to prevent uncontrolled air getting into the foul gas on its way to the purifiers.

It was agreed, too, that changes in rotation should be made frequently, once in 24 hours, or in two or three days, or at most five days. A general proposition seems to relate caking with the rapidity of sulphur absorption—the quicker the reaction the less the tendency to hardening. Pending the conclusion of the examinations which Mr. Hopton assures us are now being made of the several theories to account for this troublesome phenomenon, the general recommendations contained in his last paragraph should be carefully studied and followed as closely as may be.

It is evident that oxide purification is going to be the standard method of H_2S removal for a very long time. It would therefore seem advisable that, even if Dr. Hollings's hope of an interim report of the Purification Panel for the next November meeting is realized, with its opportunity for a wider discussion of this subject, there should be a thorough discussion of this excellent paper, much more thorough, that is, than the necessarily brief one which took place at its presentation. For very many points in this apparently exhaustive treatment of a complex process with its many variables were hardly touched upon.

GAS RESEARCH

WE publish to-day a report of the proceedings at the morning session of the Gas Research Board's annual meeting in London, on Tuesday of last week, together with a report of the speeches at the annual luncheon held on the same day. We may say at once that the meeting was a success, and on all sides there was expression of satisfaction with the Board's work, in which the liveliest interest was manifested by the discussions, both formal and informal. The Board has just completed its first quinquennium as an association qualifying for a grant from the Department of Scientific and Industrial Research. For its first quinquennium the target was £20,000, but the D.S.I.R. set the Board a higher figure for qualification for a further grant; the target was raised to £32,000. But, as Lord Falmouth, the President, mentioned at the luncheon, members had agreed to contribute a further £7,000, apart from the gift of one big contributor, and another group of contributors had promised that they would increase their subscription by £5,000. This in itself, and in a better way than any other, shows how determined the gas industry is to support the Board, and what faith it has in it. The gas industry is, and has been for long, research minded, though we think that much more could have been done in the application of short-term research findings. At the same time, when one has regard to the research work carried out by some of the large gas undertakings and by many of the firms who manufacture plant and appliances it can be claimed, as Lord Falmouth claimed, that Great Britain's gas industry leads the world in many directions.

At the luncheon a witty speech much to the point was made by the Vice Chancellor of the University of Leeds, Dr. Mouat Jones, who spoke of the long and intimate association of the gas industry with the University. It is now 40 years since the Livesey Chair was established. We heartily support his contention that an important function of a research association is to have a strong development section. He added that this is fraught with less difficulty in the case of a nationalized industry. It seems certain that under nationalization research within the gas industry will be encouraged. That is an avowed aim of the Government, and not just of the particular Party which exercises power at the moment. But whether the Gas Research Board will continue to function in its present pre-nationalization form is quite another matter. The need will, however, exist more and more for men who can seize on new ideas and use their possibilities for the development of gas in the service of the community.

A DISCOURSE TO THE ROYAL INSTITUTION

Dr. E. V. Evans has great charm, great clarity, and no little experience as a lecturer, and he was at his best in a recent Discourse to the Royal Institution when he gave a general picture of the gas industry to a distinguished audience. We feel that the aim of his lecture—to give an impression of a body of people proud of past traditions, skilled in their present technique, and confident of their ability to play a large part in restoring the fortunes of our land—was admirably, indeed strikingly, fulfilled. Dr. Evans remarked that it is as true to-day as it was last century that coal is the foundation of our nation's power of survival, and the gas industry is one of the instruments which the people of Great Britain have created to use coal to the best advantage. In other lands oil and water power may take the place of coal, but Britain has neither oil nor any substantial quantity of potential water power. The liberation of energy by the fission of certain atomic nuclei has led to a great deal of speculation on the availability of energy from this source—some of this speculation is sensational and irresponsible. As yet we know little of the world's resources of those few elements which are known to be suitable for fission, or of the capital outlay required to render these forces serviceable to man. This achievement is most spectacular, but we have no warrant to assume that it represents unlimited supplies of exceedingly cheap power, and, although it may form a supplement with special application in special circumstances, coal is likely to remain the staple fuel of this country for very many years to come.

A POSITION REVERSED

The annual luncheon of the Institute of Fuel, in London, on Thursday last was attended by over 700 members and guests—altogether a most impressive occasion. The Minister of Fuel and Power sandwiched the event between his attendance at the morning and afternoon sittings of the Standing Committee on the Gas Bill, and he proposed the toast of the Institute of Fuel, to which Professor C. H. Lander responded. Mr. Gaitskell remarked that two years ago we were facing a most serious shortage of coal in this country. On the other hand, there was a surplus of sterling fuel oil. To-day, he said, the position is reversed. "Coal production in this country has so improved that we are now able to export substantial quantities, but the oil position has worsened until there is now a serious world shortage." There may have been an improvement in the coal position, but it is expected that the National Coal Board will show a loss for the year 1947 of over £20,000,000. This is an unofficial estimate, but, broadly speaking, due to the introduction of the five-day week it takes five men to do the work of four; and though mechanization has been increased from 58 to 74% since 1938, there is no improvement on the 1938 output of 2.9 tons per man-shift. The rate to-day ranges between 2.85 and 2.9. The *Sunday Times* correspondent this week summed up the position thus: "Private ownership has gone, and with it much of the old compulsion to work and produce. Some of those now engaged in running the industry have never had any doctrinaire faith in nationalization, but they felt that public ownership was essential to full technical efficiency and looked for the development of a spirit of communal service, in place of the former competitive drive, to give the necessary productive impetus. This has not yet happened. . . Nationalization is proving not only a great economic adventure, but a great—and so far disappointing—experiment in the working of human nature." Mr. Gaitskell spoke—it seemed to us all too happily—of a future excess of inferior grades of coal due to the deficiency of washing and cleaning facilities at the pits. "Much has been said," he continued, "about the need for a national fuel and power policy. Such a policy already exists. It is that our fuel and power resources, both indigenous and imported, should be so organized and utilized as to satisfy consumers' needs at a minimum cost. The first stage is to co-ordinate the production and distribution of coal, electricity, and gas, and this is now being done. This is a major step forward, the importance of which cannot be overestimated. Then we must see that fuel is used efficiently—in the home as well as in industry—for greater efficiency must lead to reduced costs. We must also take into account the serious cost of smoke pollution—a factor which is too often ignored in any discussion of relative fuel costs. I want to see the smoke taken out of the cities of this country and in due course—we cannot do everything at once—I hope to see in

operation a plan to achieve this. Finally, we must aim at creating a full information service for consumers so that they may be able to make a proper choice of the type of fuel or appliance that they want. We have no wish to dictate to consumers what they should use; we propose to give them the full facts and let them choose for themselves."

THE GAS TURBINE

There is a wave of interest in the possibilities of the gas turbine, and we do not think this interest is at all misplaced. At a Press gathering in London, on Friday last, Mr. W. E. P. Johnson, Executive Director of Power Jets (Research and Development), Ltd., whose Company has given, and is giving, a great deal of thought to the less obvious adaptations and uses of gas turbines, referred to the gas turbine as "the most universally applicable form of prime mover yet devised." And he went on to say that an advance in compressors becomes available not only to gas turbines but to compressors as such, for whatever purpose a compressor may be required. Thus, the technology of gas turbines is extremely catholic and should be of the greatest interest to specialists in compressors, and the same view applies to the combustion of fuel, turbines, heat exchangers, and so forth. No engineer can afford to ignore the gas turbine as a compendium of technology. "It is," he remarked, "not too visionary to predict that the production of cheap oxygen, from which a whole revolution of industry may spring, will turn largely on the application of current gas turbine research and development. . . I am fairly certain that what we call the process turbine shows greater prospects of cheap dividends than do the more obvious and more easily understood power applications." Power Jets controls some 2,000 patents and applications throughout about 15 countries; and among the "miscellaneous" uses (covered by 70 patents) are chemical and physical processes, refrigeration and liquefaction, drying, and pumping and blowing.

Personal

Mr. T. A. Ross, Assistant Manager at Buckhaven and Leven Gas-works, has been appointed Manager at Fraserburgh.

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Mr. L. H. WENDON, Works Manager of the Glastonbury and District Gas Company, Ltd., has been appointed General Manager of the Helston and District Gas Company, Ltd.

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Mr. R. W. PARSONS has resigned from the Secretaryship of the Manningtree and Mistley Gas Company and the duties of that office have been taken over by Mr. J. S. HACON, Engineer and Manager, who thus becomes Engineer, Manager, and Secretary.

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Mr. V. J. E. CROWLEY, for many years representative of George Hands & Co., Ltd., Farringdon Road, London, has recently undergone two serious operations at the Royal Masonic Hospital. His many friends in the Gas Industry will be pleased to learn that he is making good progress and he hopes to resume his activities in a few weeks.

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Alderman G. PROBERT, J.P., has retired from the Board of the Wath, Bolton, and Thurnscoe Gas Board after serving for an unbroken period of 40 years. He attended the first meeting of the old Wath and Bolton Board in October, 1908, incorporated upon the purchase of the Wath-upon-Dearne & District Gas Company, and continued on the inception of the present Board in 1916. Hearty tributes were paid to the Alderman by the Chairman, Councillor P. R. Baker, J.P., and other members when he attended his last meeting recently.

Skipton Urban District Council are writing to Mr. G. B. Drayson, M.P., to ask him to press for essential domestic appliances to be exempted from purchase tax.

In Our Reference to the annual meeting of the Cornish Gas Association in the "JOURNAL" of April 21, p. 157, the word "sheet" in the first line should read "shoot."

Oldham Gas Department has just concluded an exhibition of modern homecraft and gas appliances at the Co-operative Hall, Failsworth. Special washing and cookery demonstrations were given each day.

The Sagem Golfing Society are holding their Spring Meeting on Wednesday, May 26, at Sandy Lodge Golf Club. Members who have not yet received a notice, or any members of the Southern Association who would care to participate are asked to communicate with the Hon. Secretary, Mr. L. Trewby, St. Petrocks, 65, Nightingale Road, Rickmansworth, Herts.

Diary

April 29.—**Yorkshire Junior Gas Association**: President's Day, Sheffield, 10 a.m.

April 29.—**Industrial Co-Partnership Association**: "Some Aspects of Co-Partnership," Right Hon. R. A. Butler, M.P., Royal Empire Society Assembly Rooms, Northumberland Avenue, 12.30 p.m.

April 30.—**Manchester District Association of Gas Engineers**: Annual Luncheon and Meeting, Grand Hotel, Manchester.

May 1.—**Western Junior Gas Association**: Annual Meeting, Swindon, 2.15 p.m. Address by C. H. Chester, O.B.E.

May 3.—**Eastern Junior Gas Association**: Annual General Meeting at Cambridge. Visit works of Cambridge University and Town Gas Light Company. 2 p.m.

May 4.—**National Federation of Gas Coke Associations**: National Technical Committee. Gas Industry House, 10 a.m.

May 4.—**Solid Smokeless Fuels Federation**: Technical Committee. Gas Industry House, 11.30 a.m.

May 5.—**Junior Institution of Engineers (Midland Section)**: "The Development of Domestic Gas Appliances," Colonel H. S. Walter. James Watt Institute, York House, Great Charles Street, Birmingham, 6.30 p.m.

May 7.—**London and Southern Junior Gas Association**: "Some Developments in the Application of Instruments and their Control in the Gas Industry," L. J. James (Electroflo Meters, Ltd.). Gas Industry House, 7 p.m.

May. 7.—**North of England Gas Managers' Association**: Annual Meeting, County Hotel, Newcastle, 2.15 p.m. Address by R. D. Keillor.

May 8.—**Scottish Junior Gas Association (Eastern District)**: Visit to works of the Corporation Gas Department, Dundee.

May 8.—**Manchester District Junior Association of Gas Engineers**: "Central Heating," H. Partington (Rochdale); visit to Lancashire Tar Distillers' Works, Bootle.

May 10.—**Women's Gas Council**: Executive Committee. Gas Industry House, 1 p.m.

May 10.—**London and Counties Coke Association**: Technical Committee, Gas Industry House, 2.30 p.m.

May 11.—**National Federation of Gas Coke Associations**: General Committee. Gas Industry House, 10 a.m.

May 11.—**British Gas Council**: Central Board. Gas Industry House, 2.30 p.m.

May 11.—**Federation of Gas Employers**: Central Committee. Gas Industry House, 11.30 a.m.

May 11 and 12.—**Women's Gas Council**: Meeting at Carrs Lane Meeting House, Carrs Lane, Birmingham, 3 p.m. on May 11, 2.30 p.m. on May 12. Address "Bouquet for Housewives" and distribution of brochure "Hot Water Highlights," R. J. Gregg, Sales Manager, Ascot Gas Water Heaters, Ltd.

May 12.—**Domestic Development Committee**: Technical Sub-Committee, Gas Industry House, 10.30 a.m.

May 12.—**Domestic Development Committee**: Gas Industry House, 2.30 p.m.

May 13 and 14.—**Wales and Monmouthshire Association of Gas Engineers and Managers**: Annual Meeting. Prestatyn.

May 14.—**Junior Institution of Engineers**: Fifth Stevens Memorial Lecture, "Coal, Oil, Chemicals," Dr. J. G. King. Royal Society of Arts, Adelphi, 6.30 p.m.

May 19 and 20.—**Eastern Association of Gas Engineers and Managers**: General Meeting, Norwich. (May 19: Golf competition, reception and dance. May 20: Business meeting; paper, "Refractory Materials in Relation to the Manufacture and Use of Gas," A. T. Green, O.B.E., F.R.I.C., 10 a.m. Association Luncheon, 12.15 for 12.30 p.m. Broads trip, 2.15 p.m.)

May 22.—**London and Southern Junior Gas Association**: Visit to the St. Albans Works of the Watford and St. Albans Gas Company.

May 24.—**London and Counties Coke Association**: Finance Committee, 10.30 a.m.; Executive Committee, 11 a.m.; Central Committee, 1.30 p.m. Gas Industry House.

May 24.—**British Gas Council (Midland District Board)**: Inauguration of Discussion Group for Home Service Advisers, Grand Hotel, Birmingham, 2.30 p.m.

May 25.—**Southern Association of Gas Engineers and Managers**: Spring General Meeting (preceded by informal luncheon), Connaught Rooms, London.

May 26.—**Manchester District Junior Association of Gas Engineers** and **Yorkshire Junior Gas Association**: Joint visit to Messrs. Newton Chambers, Ltd. Thorncliffe.

Preliminary Notice is given of the annual general meeting of the Women's Gas Council, which is to be held at the Central Hall, Westminster, at 3 p.m. on June 9. The agenda will be issued later.

THE GAS BILL IN COMMITTEE STAGE

(*Continued from page 156*)

ON April 20 consideration of Clause 18 was resumed, and Sir H. Lucas Tooth asked the Government the question: "When a case goes to arbitration under the Clause is the onus of proof to be on the Board repudiating the contract or the party whose contract is being repudiated?" If they got an assurance that in the event of arbitration it would lie with the Board repudiating the contract to prove affirmatively the fact on which they relied, he would be satisfied.

Mr. Robens: There is a point in the matter of the onus of proof and I undertake to look at it." He also wanted to say that he did not accept that there had been any stagnation on the development of the gas industry because of the wording of the Clause.

On Clause 22 (provisions as to undertakings carried on in areas of different Area Boards), Colonel Clarke asked for the assurance that in drawing-up final boundaries the division would not be arbitrary.

Mr. Gaitskell: "Happily, I give the assurance." When we considered the boundaries, one of the main points we had in mind was the desirability of drawing them to coincide with existing boundaries of undertakings. . . . Only in cases where it is inevitable will the boundaries be different from those now existing."

On Clause 23 Colonel Crosswaite-Eyre asked if the Minister would accept, at some other stage of the Bill, an amendment which would provide that as soon as practicable any extraneous assets of a composite company which had been directed from the Area Board would be transferred to a third party.

Mr. Robens gave this assurance.

Compensation to Holders of Securities

We then came to Clause 24 dealing with compensation to holders of securities. Mr. Nigel Birch spoke of the method of taking the Stock Exchange price of shares. Dates were fixed which were bound to result in loss to the stockholders, and in no case could these stocks be traded at par unless there was a considerable rise in the gilt-edged market. Moreover, the terms had been fixed with no possibility of redress. His amendment provided the Chancellor of the Exchequer should not fix terms under the Bill, but that they should be fixed by someone in an independent position—namely, the Governor of the Bank of England.

Mr. Glenvil Hall: I ask the Committee to reject this amendment, because it is completely unworkable, would be grossly unfair, and, in the upshot, would place on the Governor of the Bank of England, who is not directly responsible to Parliament, a decision for which the Chancellor himself should be responsible.

The Committee divided on the Question that "Treasury" stand part of the Clause. Ayes 25, Noes 7.

The compensation clause was again debated on Wednesday when an amendment moved by Mr. Nigel Birch (C., Flintshire) not to take into account "any market quotations which in his opinion have been influenced by purchases of such securities by or on behalf of the Treasury or any other Government Department" was taken in conjunction with one to provide that no action should be taken by or with the consent of the Treasury to support or otherwise influence the market value of Government securities at any time during the month immediately before the vesting date.

"We do not say that the Government is not entitled to endeavour to control prices in the gilt-edged market, or to endeavour to make the interest rates run the way they want them to run" said Mr. Birch. "We do not say that control of the rate of interest is a control which the Government ought not to exercise although, as with other controls they should exercise it with some modicum of good sense. We concede that right, but what we say is that it is grossly unfair to rig the prices in the market with a view to foisting compensation stock at the wrong price, and then to remove the control so that nobody has a chance of getting £100 worth for £100 of stock."

The Financial Secretary to the Treasury (Mr. Glenvil Hall) said Mr. Birch's amendment as drafted would set the Treasury an impossible task. The price of Government securities, as of other securities, was the result of all transactions between buyers and sellers, including those who bought and sold on behalf of the Government. If the Treasury had to disregard any Government purchases it would mean either that the Government would have to refrain entirely over a period from buying or would have to disregard Stock Exchange quotations entirely when they came to fix the date of issue of this new stock. The second amendment comprised an incredible suggestion. If accepted it would place the Treasury under a statutory obligation, as vesting day approached, to refrain altogether from buying Government securities. Open market operations were essential to the present technique of management. It was perfectly obvious that those in the City who dealt in stocks and shares were aware when a vesting date was approaching and they knew what the key stocks were which would in all probability guide the Treasury when it came to make its announcement as to price length and rate of interest.

Mr. Brendan Bracken (C., Bournemouth) said the Financial Secretary had spoken of the value of the Treasury's opinion; he wished he would consult with the disillusioned stockholders in transport and electricity. They had the heaviest proof possible of the poverty of the Treasury's opinion. In his judgment the Treasury had grossly miscalculated the market prices of those two important compensation stocks. No gas stockholder could possibily believe that the Treasury's opinion was any safeguard. The broad object of the amendment was to put an end to what he described as "the shameful market rigging" by the Treasury.

Lieut.-Colonel W. E. Elliott (C., Scottish Universities) said that as long as the Financial Secretary stuck to the fantastic method of taking over assets at a valuation influenced—and admittedly influenced—by transactions which he and the Treasury were carrying on to the scale of many scores of millions of pounds, it was inevitable that the Opposition should seek in every way to protect the unfortunate people whose real assets were being taken away and replaced by imaginary, paper assets.

Both amendments were defeated on division.

Colonel Crosthwaite-Eyre (C., New Forest) moved an amendment to insert a new sub-section whereby the value of securities acquired under any scheme enabling persons employed by any undertaker to participate in the profits of the undertaking would be determined in accordance with sub-section (2) or sub-section (8), whichever was the higher. The object, he said, was to protect co-partners and to ensure that they should receive either the price for which the shares they held were issued, or the compensation proposed under the relevant sub-sections. This meant that the co-partner would get back whatever money he had invested in the firm to which he belonged.

Mr. Gaitskell said he did not think the proposer had made out much of a case for singling out co-partners for special treatment. "We propose," added Mr. Gaitskell, "to put down certain amendments on the clause which subsequently deals with co-partnership as a result of discussions we have had with representatives of the Co-partnership Association. I must make it plain that we do not consider that we can discriminate in their favour as regards compensation. They must be treated in the same way as other shareholders."

Mr. J. R. Boyd-Carpenter (C., Kingston-on-Thames) expressed disappointment at the attitude which the Minister had taken. The claim for special treatment had been put forward strongly by co-partners themselves and the organizations which represented them. The Co-partnership Nationalization Committee had proposed that there should be proper treatment for co-partners and had asked for full compensation for the shares that were being taken from them. Individual co-partnership organizations connected with individual gas companies had similarly put their claims forward reasonably but quite firmly; among these he mentioned Watford and St. Albans, South Suburban, and Cambridge.

The Committee divided and the amendment was defeated by 9 to 24. An amendment moved by Colonel Crosthwaite-Eyre to ensure—as he put it—that anybody who has shares in the gas industry will receive £100 worth, not only nominally, but actually, of stock, was also defeated.

At Wednesday afternoon's sitting Mr. Nigel Birch moved an amendment the object of which, he said, was to rectify the special injustice inflicted on sliding scale companies, of which he believed there were about 200 in existence, by reason of the fact that during the war the periodical revision which the Government had previously carried out had to a large extent ceased to operate.

Mr. Gaitskell said the suggestion was that the market prices which would be the basis of compensation were unfair in the case of certain companies because their dividends were unduly low. He did not think a case had been made out for amendment on the lines proposed by the Opposition. Provision was proposed in the next clause for extra compensation to be paid where companies had suffered war damage, loss of revenue, and so on, which had affected their share market values.

The amendment was defeated on division by 10 to 22.

On Thursday, April 22, Mr. Nigel Birch moved an amendment to Clause 24 to fix compensation on a willing buyer-willing seller basis with an agreed additional allowance for loss of expectation of income. He said the Opposition had always argued that not only was it wholly wrong to take Stock Exchange prices as a basis of compensation, but it was particularly wrong in the case of the gas industry. The Government had never given a straight answer to objections to choice of Stock Exchange values. The Government was not administratively competent

Choice of Stock Exchange valuation was wholly fallacious, because it was affected by war damage, by very few of the companies being quoted, by the fact that the market anyway was extremely narrow—and, as had been admitted by the Financial Secretary, prices might stay at quite a nominal level for months at a time. The whole basis was wrong. "It is a particularly bad case of a swindle in this Bill," he added.

Colonel Clarke said that very strong feelings had been aroused over the failure to give adequate compensation. A great many gas company securities were not quoted. The price at which quoted securities were to be acquired indicated that any reduction on nationalization would vary from 15% to the debenture holder, or 25% to the preference holder, to approximately 30% for the ordinary stock holdings.

Mr. Glenvil Hall, Financial Secretary to the Treasury, said he regarded the Stock Exchange as the recognized market for exchange between a willing buyer and willing seller. "We see nothing dishonest in accepting that valuation as the value of compensation which should be given to the holders of any particular security."

Mr. Brendan Bracken quoted a Stock Exchange Council announcement in connexion with Stock Exchange values as compensation for Railway stockholders that Stock Exchange quotations were not related directly to the value of a company's assets or the amount of its profits. "This is confiscation—cold-blooded, mean confiscation," declared Mr. Bracken. "Can anyone imagine the effect on an ageing person of a drop in income of from 45 to 15%?"

When Mr. Hall interjected that Mr. Bracken should not make statements that he could not substantiate, Mr. Bracken retorted that he could certainly substantiate many such cases. "All I can say about the Government's policy is that it is altogether worthy of the twisted minds of the class warriors responsible for this type of legislation. We are asking people to give up good gas securities in return for a shoddy confetti which the Government Socialists call Government stocks."

Mr. D. Chater (Lab., Bethnal Green, N.E.) said that as one who had spent 25 years in Stock Exchange offices he was considerably puzzled by the kind of criticism made by Conservative members. It seemed there was an objection to taking Stock Exchange prices as the basis of valuation. How else would the Opposition find a willing buyer and willing seller? A price margin might be as wide as £100-£125, and if so it was perfectly obvious that it was almost impossible without an absolute valuation by experts of the whole assets. He suggested the Opposition were trying to make nationalization impossible.

Col. Elliot gave the committee specific instances of reductions in income ranging up to 45%.

Mr. Gaitskell, Minister of Fuel and Power, then moved the closure, and the amendment was defeated.

Capital Value

On the motion that Clause 24 stand part of the Bill, Mr. I. J. Pitman (C., Bath) said the Government's whole case based on Stock Exchange prices had broken down, because on top of loss of income, which the Government admitted, there was loss of capital which the Government said did not happen because the stock was Treasury guaranteed and gilt-edged. It had been proved impossible to maintain capital values of compensation stock.

Mr. Gaitskell, remarking that the Committee had spent a long time on compensation, said the Opposition had not once mentioned the gas consumer. It would be consumers who would pay if the stockholders got more. Was the Government's ability to finance the capital of industry at a lower rate than that at present operating a thing the Opposition disagreed with? He could see no objection. It would benefit consumers. To give gas stockholders the same income as hitherto would result in them having stock conferring an enormous capital gain.

After further debate, the clause was approved on a division.

This brought us to Clause 25 (increase of value of securities of companies suffering loss of revenue from war causes). The comparison years according to the Bill are -1944 and 1938. Colonel Crosthwaite-Eyre said that it was not till 1945 that this country suffered one of its worst attacks by the V1 and V2 weapons. They wanted to increase the scope of the provision so that the date taken should be anywhere between 1943 and 1945. It would mean that all cases where genuine loss had been suffered during the war period would be covered.

Colonel Clarke supported the amendment.

Mr. Gaitskell said that the reason they selected 1944 was that

(*Continued on p. 223*)

NEW W.-D. INSTALLATION AT OSWESTRY

Inaugural Ceremony

TO mark the formal opening of a new installation of Woodall-Duckham continuous vertical retorts at the Oswestry Gas-Works, the Directors of the Oswestry Gas Light and Coke Company, Ltd., gave a luncheon at the Wynnstay Hotel. Later the new installation was formally opened by the Mayor, Councillor Miss E. G. Rogers.

At the luncheon, Mr. C. H. Wallace Pugh, Chairman of the Company, presided. He was supported by the Mayor and Mayoress (Miss K. M. Tugman); Mr. E. H. Bradley, Chairman of the Oswestry Rural District Council; Directors of the Company—namely Messrs. Harold W. Thomas, R. J. S. Parry Jones and C. B. Barnes; Mr. J. V. Beckett, General Manager and Secretary; and Mr. A. F. Topley, of the Woodall-Duckham Company.

The toast of "the Town of Oswestry" was proposed by Mr. Harold Thomas, who spoke of the town's ancient origins and tracing the growth of its customs and institutions said the new plant at the gas-works was a development that made for progress. They on the Corporation appreciated very much the kind of service and co-operation that had been given them by the Gas Company. They congratulated the Company on what it had done for the town and the progress it had made.

Mr. E. H. Bradley, in proposing the toast of "The Gas Company," said Oswestry was one of the earliest towns to have gas lighting. The Company had served Oswestry for many years, and, in a reference to what the future might hold under nationalization, he expressed the view that, if the undertaking was taken over, the public would not get better service and would certainly not get cheaper gas.

Mr. Wallace Pugh responded, and Mr. Parry Jones proposed the toast of the contractors, the Woodall-Duckham Company, Mr. A. F. Topley replying.

After the opening ceremony by the Mayor, the gathering was conducted on a tour of the new installation and inspected the works generally, including plant that had been installed in recent years. This latest development of a retort house set in a steel-framed brick building sets the seal on the modernization of the plant and its equipment to meet all possible demands. Its attractive lines were freely remarked upon. The tour was organized by Mr. E. F. Charles, Works Manager, with the co-operation of the contractors' operating engineers, and conducted by Mr. Charles, Mr. F. A. Green, and Mr. Littlehales.

The new installation consists of one bench containing eight upwardly-heated Woodall-Duckham continuous vertical retorts capable of carbonizing 35 tons of coal and of producing 663,300 cu.ft. of 450 B.Th.U. gas per day. The retorts, which are set in double line, are about 25 ft. high, 44 in. long and 10 in. wide at the top. They are arranged so that any one retort can be controlled without affecting the others, and, in addition, three air-cooled division walls divide the bench into four sections, each containing two retorts, which can be heated up or let down cold without interfering with the working of the others.

To supply the gas for heating the retorts two step-grate producers are provided in a separate battery at floor level at one side of the bench. Each producer is capable of heating six retorts and either may be shut down without interfering with the working of the other.

The retort house is an attractive steel-framed brick building of modern "vertical" design with all steelwork totally enclosed on the outer faces. The lift tower and the coke storage hoppers have been designed to harmonize with the retort house, and sand-faced bricks and Trafford tiles have been used throughout their construction.

The installation has been designed so that two retorts can readily be added in the future. The retort house, chimney, waste heat boiler, &c., are all large enough to accommodate or serve the extended plant.

New plant to meet the growing needs has been installed as follows:—

1940. New exhausters of 25,000 cu.ft. per hour capacity by the Bryan Donkin Co., Ltd.

1941. A new carburetted water gas plant, operated automatically, of 200,000 cu.ft. per day capacity, was built by R. & J. Dempster, Ltd., who at the same time built a new gasholder into an existing tank for the reception of crude water gas.

1942. New Livesey washer of 750,000 cu.ft. per day capacity by Firth Blakeley, Ltd.

1943. New horizontal water tube condenser to deal with 800,000 cu.ft. per day erected by R. & J. Dempster, Ltd.

1944. Coal receiving hopper, bucket elevator, with storage and loading bunker at Hollies Railway Siding to facilitate unloading of railway wagons and quicker return of empties.

1944. New Lancashire steam boiler.

1945/46. A new set of four purifiers.

ANNUAL MEETING OF THE GAS RESEARCH BOARD

PURCHASE OF BECKENHAM HEADQUARTERS COMPLETED

THE seventh Annual General Meeting of the Gas Research Board was held at the Institution of Mechanical Engineers, Storey's Gate, Westminster, on April 20, under the Chairmanship of Dr. H. Hollings, Chairman of the Council. The morning proceedings comprised the election of officers for the ensuing year, the presentation of the Ninth Annual Report of the Council of the Gas Research Board, and the presentation and discussion of the report of the Director for the year 1947.

The **Chairman** said that under the provisions of the Articles of Association of the Gas Research Board, the President, Viscount Falmouth, would retire at the close of the meeting unless he was re-elected. They had been exceedingly fortunate in having the help and advice of Lord Falmouth, and that had been particularly the case during the past year. They had been negotiating with the Department of Scientific and Industrial Research the terms of the Government grant for the second period of five years, to which reference was made in the report of the Council, and on behalf of the Council he wished to express warmest thanks to their President for the very valuable help he had given them. He also added an expression of his own personal thanks for the way in which Lord Falmouth had always been available for consultation. It appeared that the Gas Bill which was now before Parliament might become effective during the coming year, and it might well therefore be a critical year for the Gas Research Board. The experience and advice of Lord Falmouth would be invaluable, and he had the greatest pleasure in proposing his re-election as President.

Dr. **E. V. Evans** seconded the proposition and said he hoped he would not be considered old fashioned or too traditionally minded if he said that they as commoners were very grateful that one holding so historical a name devoted his time so largely to the promotion of pure and applied science.

Lord **Falmouth,** in acknowledging his re-election, said he highly appreciated the honour. He realized that in the gas industry they were going through a very difficult and worrying stage, and they must have what might be called a caretaker government in office for the time being. Such a government was never very popular, and usually finished up with a kick in the pants. He promised that he would do his best in the difficult circumstances to help forward the interests of that very important Board.

Vice-Presidents

The **Chairman** proposed the re-election of Mr. E. Crowther as a Vice-President of the Board. As Senior Vice-President of the Institution of Gas Engineers, Mr. Crowther was destined for a more important post within the next few months, and they were happy to think that he would continue to devote part of his time to the interests of the Gas Research Board.

Mr. **A. G. Grant** said he had two good reasons for seconding the re-election of Mr. Crowther; first, because he represented the Institution of Gas Engineers; and secondly, and more personally, because he came from the North-East Coast area.

Mr. **Crowther** briefly returned thanks for his re-election.

The **Chairman** explained that Sir Ernest Hiley was retiring from the office of Vice-President, and he wished to thank him for his help during the past year. Those who had read the report of the Council would be aware that his help had been of a very practical character. Sir Ernest and his fellow Directors of Main Water Heaters, Ltd., had provided laboratory accommodation for part of the Gas Research Board's staff who might otherwise have been homeless. He asked Mr. A. Forshaw to convey the thanks of the meeting to Sir Ernest Hiley for his past services. The Society of British Gas Industries had nominated Mr. D. M. Henshaw for election as Vice-President in place of Sir Ernest Hiley. Mr. Henshaw had been an Ordinary Member of Council since the inception of the Board, and he was sure every member of the Council would wish to be associated with him in thanking him for his services. They had done their best to retain him as an Ordinary and a very active member of Council, but he seemed to have circumvented all their efforts, and he felt they must respect his wishes. He therefore had great pleasure in proposing his election as a Vice-President.

Mr. **Norman Hudson** (Mirfield), in seconding, said those who knew Mr. Henshaw were fully aware of his great interest in research. Even though they were losing him as an Ordinary Member of Council, he would undoubtedly prove to be a very valuable Vice-President.

Mr. **Henshaw** briefly returned thanks for his election.

The **Secretary** (Dr. W. T. K. Braunholtz) reported that one-third of the members of Council were due to retire by rotation, comprising three nominees of the Institution of Gas Engineers (Dr. E. V. Evans, Mr. W. Dieterichs, and Colonel Harold C. Smith), and two nominees of the Society of British Gas Industries (Dr. Harold Hartley and Mr. R. G. Potter). Both bodies had re-nominated the same members as before. To fill the vacancy for an Ordinary Member created by Mr. Henshaw's elevation to the Vice-Presidency, the Society of British Gas Industries nominated Mr. A. Whitaker.

Congratulations to Colonel Smith

The **Chairman,** in the name of the Board, offered hearty congratulations to Colonel H. C. Smith on his appointment as Deputy-Chairman-designate of the Gas Council, to be set up after the Gas Bill becomes law. Colonel Smith, he said, took a very active part in the formation of the Gas Research Board and had been a member of the Council throughout its life. It was fortunate for them that they were able to retain his interest in their affairs, and they wished him every success and every possible happiness in the new work which he would be undertaking.

Colonel **H. C. Smith,** in response, said the Chairman's kind remarks had come rather unexpectedly and he was somewhat at a loss as to what to say in reply. During the last few days he had received kind messages from many friends in the industry wishing him luck in the job which was to fall to him. He knew he would need all the good wishes of all his friends, and he appreciated very much the kind words of Dr. Hollings. He had always been particularly interested in the work of the Gas Research Board, and he thought he could claim to be one of its three fathers, the others having been Dr. Evans and Dr. (now Sir) Ernest W. Smith. The Chairman had been the wicked uncle; he had repented and was now making an admirable foster-father.

None of them could foresee what the future of the Gas Research Board was going to be; it was obviously much too early. The Gas Council was to have imposed upon it very definitely the duty and obligation of research, and he thought he could say that both the Chairman-designate and the Deputy-Chairman-designate were fully aware of the work the Gas Research Board had done in the past, and of the very urgent need for developing that work in the future.

On the proposition of Mr. **T. C. Finlayson,** seconded by Mr. **J. E. Davis,** Messrs. Cash, Stone and Company, Chartered Accountants, were re-appointed Auditors for the ensuing year.

The Annual Report

The 9th annual report of the Council, after summarizing the appointments made at last year's Annual General Meeting, states that the Council has held seven meetings during the year, and its committees have met regularly to advise on the more detailed affairs of the Board. A great deal of attention has been paid to the development of the research programme and to the organization necessary for the most effective execution of the programme. It has been decided that the best method of planning some of the more specialized researches under the guidance of those associated with the industry who have particular knowledge, is to set up advisory panels with terms of reference laid down and revised by the Council from time to time in the most precise terms practicable.

The Advisory Panel on Gasification will continue to advise the Council and the Director on the development of the programmes which will be familiar to those who have followed the recent researches of the Board. With the experience now accumulated in the research on the high-pressure gasification of coal, it is realized that the design of the original pressure vessel intended for the hydrogenation of coal imposes certain limitations upon the programme of experiments, and accordingly consideration is being given to the practicability of obtaining a new vessel designed for a study of the behaviour of British coals in different atmospheres of steam and air and, ultimately, of steam and oxygen. It is anticipated that the programme on methane synthesis will soon reach a stage at which it can be discontinued pending some industrial development. An apparatus is on order which will enable new experiments in connexion with the use of preheated blast on a water gas generator to be conducted.

It was mentioned, during the course of the proceedings at the 6th Annual General Meeting, that the programme was being extended by the inclusion of new studies in connexion with gas purification and the size distribution of coke; each of these subjects is under the care of a panel of experts. Other researches of particular interest to gas engineers relate to corrosion in water-cooled condenser tubes and to wind stresses in gasholders. New panels have been appointed to advise on these matters.

Some of the foregoing researches may well be, in their early stages, more severely practical than those which have been undertaken previously by the Board. It may be found that some of them develop into what is known in other quarters as "operational research." It is not intended, however, that the Board should

neglect longer-term projects, but it is believed that in the execution of some of the shorter-term practical projects upon which the staff is now engaged a clearer view will be obtained of what are the longer-term requirements of the industry.

It would be quite impossible for the Council to conduct and expand its present programme without the very active co-operation of member undertakings and of a number of persons connected with the industry. The Council particularly desires to thank those who have accepted invitations to serve on the advisory panels. The list of members shows that some of them are outside the membership of the Council, and they deserve the thanks of the industry for making their expert knowledge freely available. As is well known in the industry, much of the gasification research has been carried out at the Pitwines Works of the Bournemouth Gas and Water Company, where laboratory accommodation, as well as other facilities, has been provided. This accommodation is being extended so as to provide additional space for new researches such as that on gas purification. Once more the Council has to record its very sincere thanks to the directors and staff of that Company. Thanks are also due to the City of Birmingham Gas Department, the Gas Light and Coke Company, Ipswich Gas Light Company, Liverpool Gas Company, Perth Corporation Gas Department, Sheffield and District Gas Company, the South Metropolitan Gas Company, and Wandsworth and District Gas Company for their co-operation in works tests in connexion with gas purification.

It is realized that, owing to various limitations, the Board was unable, during the first few years of its existence, to undertake as much work in the field of gas utilization as was desirable. What has been possible has included the survey of combustion characteristics of town gas, and the study of the effects of sulphur on the corrosion of appliances. On the fundamental side there has been the study, at the University of Leeds, of radiation in the infra-red region, and the beginnings, in London, of several research projects on gaseous combustion. The symposium on combustion research, which was arranged on the occasion of the 6th Annual General Meeting, has, as intended, stimulated discussion of possible lines of research. The special Committee on Gas Utilization of the Council has been expanded and charged with the duty of reviewing the work of such panels as may be necessary in the field of gas utilization, and of advising the Council what further researches in this field appear to be desirable and practicable. As yet only two panels dealing with specific researches, namely, those on corrosion of water heaters and on gas-meter diaphragms, have been formed, but it is anticipated that others will be formed, particularly in connexion with more fundamental researches, as soon as the discussions of the Committee have reached a more advanced stage.

Peak Load Gas

In the course of the symposium, references were made to the present-day conceptions of slow combustion at low temperatures and to the circumstance that one of the member undertakings was engaged upon the development of a process of making gas from oil which was based upon these slow-combustion reactions. It is fitting, therefore, that at the present meeting of the Board to which this Report will be submitted, a paper is presented by Dr. M. Maccormac, entitled "The Production of Peak-load Gas by the Partial Combustion of Oil," supported by a paper by Dr. R. S. Silver, one of the Joint Assistant Directors of the Board, on combustion theory.

The Council also decided, in the early part of 1947, that the results of the Fuel Research Board Coal Survey Reports should be reviewed and interpreted in so far as they affect the gas industry, with a view to the publication of such interpretation during the current year. Having regard to the Director's special knowledge in this field, it is gratifying to report that he has been able to undertake the work and that he is preparing a paper for presentation at the 85th Annual General Meeting of the Institution of Gas Engineers.

As in previous years, the Director is reporting on the progress of work in hand, and on this occasion it has been thought appropriate that his Report should be issued separately to members, as it is sometimes required for purposes quite distinct from the purposes served by this more formal report of the Council. A list of the published researches of the Board, for 1947, appears in the Directors' Report (GRB 37).

The very happy associations with the University of Leeds and with the British Refractories Research Association have continued, and to these two bodies the Council wishes to express its gratitude and thanks.

Several attempts have been made to recruit additional staff to cope with the expanding programme of work. There have been changes due to a variety of causes, and perhaps it is a reflection of the general shortage of scientific manpower in the country that the detailed list in the Director's Report shows that the total number of personnel has actually fallen during the year from 66 to 61. In these circumstances a special word of thanks is due to the present members of staff for the services which they have rendered.

It is with great regret that the death of Dr. A. H. Eastwood, a senior scientific officer, is reported. Dr. Eastwood first joined the Joint Research Committee of the Institution of Gas Engineers and the University of Leeds as a research assistant in 1931, and was working at Leeds almost up to the time of his death. He had been ill for some months, and his courageous efforts to continue his researches commanded the admiration of all his colleagues.

The purchase of the headquarters site at Beckenham has been completed, although it may be some months before vacant possession of the existing building can be secured. It is clear to the Council that in present circumstances, which, so far as new buildings are concerned, appear to be particularly difficult in the London area, there may be considerable delay before new buildings of a permanent character can be erected on this site. It is anticipated that during the current year it will be practicable to repair and adapt the present buildings and possibly to add one or two semi-permanent prefabricated structures to provide accommodation for the headquarters staff now at Gas Industry House, the Intelligence Section, and laboratories which will be at least adequate to accommodate those of the staff who have worked hitherto in the laboratories of the City and Guilds College, South Kensington. Thanks are due to the College for having made accommodation available. The College laboratories are now required for the use of students before the building at Beckenham is vacant. In these difficult circumstances the directors of Main Water Heaters, Ltd., kindly offered temporary accommodation in their works at Croydon, which the Council gratefully accepted.

The report includes the usual financial statement, and attention is called to the circumstance that there has been a considerable increase in expenditure consequent on the expansion of the research programme and the preparations made to establish headquarters at Beckenham. There is a balance in hand of £35,049, but it is anticipated that this will be absorbed within a short period in connexion with the repairs, adaptation, and equipment of the headquarters.

A New Target

When the Board became associated with the Department of Scientific and Industrial Research, the terms of the Government grant were determined for a period of five years which terminated on Dec. 31. The subscriptions received from the industry during the last two years have been nearly sufficient to qualify for the maximum grant, of £20,000 per annum, which was determined five years ago. The Council has now received, and has accepted, the proposals of the Department of Scientific and Industrial Research for a further period of five years. Briefly, the new terms upon which a Government grant will be receivable are that the industry must make subscriptions amounting to £32,000 per annum in order to qualify for the first block grant of £14,000. For every additional £100 by which the grant-earning income exceeds £32,000, an additional grant of £100 will be receivable up to a maximum additional grant of £14,000 per annum. Thus, the maximum total grant on industrial subscriptions amounting to £46,000 or over will be £28,000. In view of the increasing expenditure and the new terms on which the Government grant is receivable, the Council is asking for increased industrial subscriptions.

Referring to the Gas Bill, the Council notes that it is proposed that the Gas Council should settle from time to time, in consultation with the Minister, a general programme of research and that they should take certain steps to secure the carrying out of the programme. It is hoped that when the Gas Council is established there will be a proper recognition of the service which the Gas Research Board can render the industry. Not only does this Board represent an association between the producers of gas and the makers of plant and fittings, but it has established associations with other research organizations which should not be set aside. In particular, it may be mentioned that the association between the gas industry and the University of Leeds, which has continued for over 40 years and which is now represented by the Joint Research Committee of this Board and of the University, is probably unique in British industry.

The **Chairman** presented the report in summary and moved its adoption.

Dr. **E. V. Evans** seconded the adoption of the report and said he thought the innovation of separating the report of the Council from the report of the Director was most useful for it allowed them to discuss the business arrangements of the Council quite apart from the technical aspects. It had been the policy of the Council in the past to accumulate funds in order that when the war finished they would be able to execute much more work That was done as a matter of policy and in a way it was forced upon them because they could not make progress during the war if they wished to do so. He was sure the policy was sound. They might have said they did not want the members' subscriptions, but instead they had proved a substantial backing to the Board's finances at the present time. On the other hand there was still need for a great deal more money. The Chairman was much to be commended for his successful attempts to accumulate

more money and get a bigger income for the Board; he felt he had been aggressively efficient. Finally, there was the question of nationalization. The prosecution of research was one of the responsibilities that would continue to rest on the industry in the future, and he hoped that the new administrators of the future would accept the Gas Research Board as the right and proper institution to carry out such research as could best be carried out on a national basis.

THE DIRECTOR'S REPORT

Dr. **J. G. King,** the Director, said it was now his duty to present a general account of the scientific work of the Gas Research Board during the calendar year 1947, to indicate what progress they had been able to make and to reflect on the directions in which they were moving. This he had done in GRB 37. He was sure they had all studied this and were ready to discuss it, but he must first make some attempt to point out what they considered to be the important features of the year's work, whether in the advancement of scientific thought or technique, or in the general planning of co-operative research for the good of the gas industry.

In arranging the report, he had divided the subject matter into a small number of main sections in which they would recognize the natural divisions of the technical work of the industry. Before each of these sections he had presented a short summary of the projects, or lines of research, so that the reader could see readily the nature of the subjects covered. He felt that these summaries should help the general reader, show the place of each project in the general pattern of research, and even draw attention to the gaps in it.

Under the first heading of "Gas Production, Purification, and Storage" it would be seen that they had at present no active work on existing methods of gas production, although they were making preparations to re-study the water-gas process by examining the effect on the mechanics of the reactions in the fuel bed of preheating the blast. This would be done on the full working scale and should start towards the end of 1948.

They had continued their researches which had been aimed at new methods of gas production, namely, the gasification of coal in oxygen and steam under pressure, and the catalytic synthesis of methane. In the former they had during the year gathered new evidence on the course of the reactions between hydrogen (and $(H_2/CO$ mixtures) and coal and semi-coke, *i.e.*, those of the upper levels of the bed of a complete generator. They had now a very fair idea of the kinetics of these reactions and the time had come when they must take a step forward towards full-scale application. Their present reaction vessel employed a static bed of 300 lb. of fuel; the next change must involve a moving bed. The Gas Production Panel was considering at present the details of a generator to operate for runs of short duration on oxygen and steam, designing this generator so that it could be operated in due course with the present one, the two together providing a moving fuel bed.

Attention had been attracted to the alternative method of controlling the reactions by employing powdered coal and a "fluidized" bed. It was obvious that high rates of gasification and precise thermal control should be attainable by this technique, if the mechanics of flow could be controlled through the phases of devolatilization, gasification, and ash concentration. In the United States a very considerable effort was now being applied to determine the correct conditions for the conversion of coal to synthesis gas in this way, at atmospheric pressure. Their problem, using pressures up to 50 atmos., was at first sight more difficult, but they had made a promising start. He could not say more at present.

Need for a Bold Step

Whatever direction they moved, it was very clear that a bold step must be taken soon if they were to make a real attempt to solve the development problems involved in this form of complete gasification. It had been held that the cost of industrial oxygen might be a limiting factor, but it was becoming clear that advances were taking place in this field which would present a more favourable prospect, particularly if the power, &c., costs were integrated with those of gas production.

A dependent part of the general programme on complete gasification had been the catalytic synthesis of methane from mixtures of carbon monoxide and hydrogen. Studies of methods of preparing catalysts and of the kinetics of the reactions were continued at Leeds and Oxford during the year, while an advanced catalyst was being subjected to semi-scale trial at Poole under operating conditions suited to the efficient control of the reactions. The first such "proving" experiment had shown that the catalyst had both sufficient activity and life to satisfy all the practical requirements for full-scale conditions. They had also proved that the methods of control of the reactions were entirely satisfactory for the synthesis at an operating pressure of 20 atmos. Thus they had all the data necessary for the design of a plant for methane synthesis under pressure from carbon monoxide and hydrogen, should this be justified by economic considerations. It remained to confirm, in a similar run, the adaptability of the process to atmospheric pressure conditions. This they hoped to complete during 1948. In the meantime, and assuming success in this operation, they had discontinued the fundamental work on reaction studies for the time being. Their collaborators at the Fuel Research Station had reached a similar conclusion and were bringing their researches to a close also.

Mr. Wood's survey of the distribution of organic sulphur compounds in town gas was completed during the year. No new research projects arose from it. The related work on the catalytic removal of sulphur compounds from purified coal gas had also been discontinued and this project had been concentrated solely on the further examination of the breakdown of organic compounds in unpurified gas. Should this prove successful it allowed one stage of purification and heat transfer to be dispensed with, in a system in which all sulphur compounds, other than thiophen, would be removed. As stated in the report, the mechanism of the reaction involved (hydrolysis) had proved successful in the laboratory and was now undergoing practical trial under works conditions.

Some consideration had been given to the starting of an investigation on the evaluation of fluid methods of purification of coal gas from hydrogen sulphide, but it had been deemed wiser first to make a concentrated attack on certain difficulties in the oxide method of gas purification, particularly that of the hardening of the oxide. The dependent variables involved in this process were so numerous that the true explanation of hardening was not known, and it was considered that some months of concentrated effort to clarify the position would be of immediate value in the industry. The experimental work on this subject had taken two courses, the obtaining of data from gas undertakings who were helping in this matter, and the examination under laboratory conditions of the variables involved in the process. In the report he had limited himself to an account of the nature of the problem and the variables involved and to a description of the course of action which they were taking. It would be unwise to attempt to discuss early results at this stage. The Chairman also had referred to this matter. He would acknowledge, however, with special thanks, the help they were obtaining from those undertakings who were collecting data under controlled conditions and supplying a constant stream of new information. Since each undertaking was giving special consideration to one or more of the variables involved, a critical examination of this mass of information would undoubtedly shorten the term of this investigation.

Active Research Projects

In this section there were other active research projects. One was the continued study of the causes of fracture which was brought about by chemical corrosion in welded gas mains and the other was the examination of wind pressures on spirally-guided gasholders. During the latter part of the year they had been engaged in preparing and standardizing methods and apparatus for the measurement of wind pressures under the limiting conditions of high wind velocity. The first objective would be to determine whether there was any correlation between the observations on actual holders and the results of the experiments on models which were described in GRB 20. If a correlation was found it would open the way towards the application of the results of the "model" experiments.

The second main section of the report was concerned with researches associated with the production and utilization of coke. With the co-operation of the National Coal Board it had been possible to undertake an experiment to evaluate the effect of ash on the coke produced under two carbonizing conditions. A Yorkshire gas coal had been supplied at two levels of ash content, 3.5% and 8%. The original intention had been to operate an entire works on each coal in turn for a sufficient period of time to obtain precise data on the economics of the use of clean coal, but it had proved impossible under standard conditions of both types of coal in continuous vertical retorts and of one coal (ash 3.5%) in horizontal retorts. The cokes prepared were now undergoing examination by a variety of combustion tests and information would no doubt emerge which would throw some light (if not all that had at first been hoped) on this important question. It was hoped to obtain horizontal retort coke from the coal of 8% ash in order to complete the series.

Special emphasis had been placed during the year on the study of the breakage of coke and its degradation on handling, and the fundamentals of coke breakage by cleavage, in order to assess the possibilities of increasing the yield of sized coke and decreasing the production of breeze. As a first step, a study had been started of the performance of different forms of crushers and of the extent to which degradation occurred under different conditions of handling and screening. Test conditions had been set up at Poole whereby breakers of different types could be examined in the same coke stream. Before starting the test work it had been

necessary to develop and standardize methods of test, and of sampling, and of screening, in order to reach the close limits of accuracy which would ensure sufficient differentiation between the different breakers. Once this preliminary work had been completed new experimental data had been collected fairly rapidly. A start had also been made with the physical study of breakage, but for the moment this was taking second place to the more practical aspect of the problem. In all this work close touch was being maintained with the London and Counties Coke Association and with the Coke Research Association.

Under the heading of "Utilization of Gas" they had a number of projects which had factors in common, from the combustion properties of gases, through combustion theory and investigation, to heat transfer and the physical resistance of combustion appliances to the conditions imposed. The work in this section had made better progress during the year, and further extensions, particularly in the field of fundamental combustion research, were planned for this year.

Last year's symposium of Combustion Research (GRB 31) had given many valuable leads towards new projects and, as forecast last year, they had extended their work. This now included the projects arising from Mr. Wood's survey of combustion characteristics of town gas and from studies of flow phenomena in flames, combustion in flames, and flame speed. He would draw their attention particularly to the adaptation of Schlieren technique to the study of flow phenomena in flames and the specimen photographs. He would also remind them that a paper from this group was being presented by Dr. Silver.

Combustion research had always been a feature of the joint work of the Institution of Gas Engineers and the University of Leeds and the last few years had seen a revival of this. In order to integrate this work with that of the London Group, and to develop the whole, a combustion research group had been formed under the Joint Research Committee, with Dr. Garside as team leader under Professor Roberts, and including Dr. Kilham and Mr. Culshaw. With this new blood the joint programme should be able to give greater help in the solution of those basic problems which affected the development of heat-consuming appliances.

In the section on heat transfer they had two active projects: (1) The extensions of Professor Roberts's work on infra-red radiation, and (2) the study of the methods of measurement of radiation. The first was helping the second by studies of emission spectra of radiants, &c., and was extending in the direction of the application of infra-red spectroscopy in the analysis of gas mixtures.

The practical study of combustion in appliances involved the corrosion of metals by products. They had now dealt sufficiently with the empirical examination of gas water heaters to move in the direction of the laboratory examination of the basic factors. Two methods were being used: (1) The study of prepared metal surfaces exposed to combustion products under controlled conditions, and (2) the study of the physico/chemical data for the system S/N/O water. Neither had as yet progressed far enough for detailed report. In addition they had recorded the beginnings of a study of scale deposition on the water side.

Dr. Haselden had continued his researches on gas separation, at low temperatures, under Sir Alfred Egerton. He would remind them that the possible application of the use of oxygen in the gas industry—for purposes of complete gasification of coal—would involve the manufacture of oxygen, probably by separation from air by liquefaction, and that the integration of this with other procedure could lead to the separation of methane for thermal storage and ethylene for chemical manufacture. Dr. Haselden's work on the fundamental of heat transfer at low temperatures, and upon the conditions necessary for the continued operation of heat exchangers had considerable value to the designers of plant for gas separation.

He proposed to take as read the section dealing with research on refractory materials since a full report up to November, 1947, had been presented by Mr. A. T. Green at the Autumn Research Meeting of the Institution of Gas Engineers. Notes on the active studies in this section, however, were given briefly in the report under the two main heads of "Properties of Refractory Bricks" and "Properties of Refractory Insulating Material." This also applied to some of the smaller research projects, but did not mean that any of these should be excluded from their discussion if they so wished.

Finally, he had to report that the Intelligence Section was now fully planned for the work which it was to do. It was still short staffed, but the pattern of its work was there and it was doing a good job of providing the staff with up-to-date scientific information. It had issued only three information circulars although he would have liked to have seen more, particularly on subjects which were difficult of access to members. He hoped that in due course a service of this kind would become an important part of the work of the section.

The Chairman had made some reference to shortage of laboratory space and to shortage of staff. They were doing their utmost to remedy both, but Dr. Dent and he would like to take that opportunity of paying a tribute to the staff for their energy and zeal under short-handed conditions and under the difficulties of living in a dispèrse phase.

DISCUSSION

Professor **A. L. Roberts** said he felt the size and substance of the Director's report would demonstrate the wide field of the Board's research work and the expansion of its activities during the year under review. Even so, as Dr. King had indicated, the planned programme of the Gas Research Board was much greater than was shown by the necessarily short accounts given of its work in progress. It was to be hoped that the next and subsequent years would bring the additional accommodation and staff needed for the full implementation of the programme, including in particular the establishment of headquarters at Beckenham.

The report indicated once again an especially welcome feature, which to a large extent must compensate for the present lack of headquarters; this was the extensive collaboration with undertakings and research institutions which the Board had been fortunate to obtain and wise to foster, and through which much of the present programme had been made possible. The facilities provided at Bournemouth had enabled the programme on complete gasification and in other fields to continue and a start to be made on projects of immediate interest to the industry, such as the study of oxide purification. Both these seemed to him to be good examples of research work which the Gas Research Board was well fitted to carry out. The former was intermediate-scale development work, the prosecution of which was an important service which a research association could and should render to its industry. The latter represented a direct attack on a problem of current concern to the industry. Incidentally, in connexion with the hydrogenation work, he had been glad to see the close attention being paid to the possibility of applying fluidization methods, although recognizing the inherent difficulties which Dr. King had emphasized.

The collaboration which was such a strong feature of Gas Research Board work also included work at the Fuel Research Board, at Imperial College, with the British Refractories Research Association—this covering a wide range of investigations of direct interest to the industry—and with many other industrial and research organizations. Then there was also the collaboration with the University of Leeds, 40 years old and now stronger than ever, to which the Chairman had already made reference. Perhaps he might comment briefly on the present relationship and future trends.

Dr. King had referred to the recent strengthening of the research work in the field of gas utilization, a feature which he was sure would be appreciated by the industry and one which was particularly welcome to his colleagues and himself at Leeds. The combustion work which had been in active progress for some years at Leeds had now been incorporated into the programmes of the Joint Research Committee of the Board and the University. In addition, steps were being taken to effect as close a collaboration as possible between the Leeds and London teams, not merely on paper but by constant contact between the individual workers. In congratulating Dr. King on his report, might he express the hopes of his colleagues and himself for the continued expansion of the Gas Research Board's activities, which the University, through the Joint Research Committee, would do all it could to further.

Newcastle's Experience

Mr. **E. Crowther** (Newcastle and Gateshead Gas Company) said the report described very clearly the extensive and well-balanced programme of work which was in hand, and no one could read it without being impressed by the scope of the investigations upon which the Board was engaged. Beyond saying that, as an engineer, he was particularly pleased to note that the programme included a number of enquiries which might well lead to results capable of early practical application, he proposed to confine his remarks to one section only of the report. He referred to the synthesis of methane.

From a study of the recently published 49th Report of the Joint Research Committee of that Board and of the University of Leeds, it appeared that the process had reached a degree of technical success such as to deserve and invite a close examination of its application to a plant of commercial scale. At about the time when the Report had been published the Newcastle Company had been preparing to erect an additional water gas plant, and it had been felt that there was both an opportunity and a duty upon the Company to consider the desirability of introducing the methane process either in place of, or as an alternative to, oil enrichment of blue water gas. With the assistance of certain firms of contractors, an attempt had been made to assess the economies of such a project, and it might be of interest to record the conclusions reached.

In the first place, it was apparent that as about half the thermal output of a standard C.W.G. plant producing gas of 500 C.V. was derived from oil, the capital charges per therm when blue gas

was being produced were twice as great as when carburetting with oil. To obtain the fullest value from the capital spent upon the generating plant it therefore had seemed necessary either to design the plant solely for blue water gas production, without oil carburetting equipment, as base load plant throughout the year, enriching by synthesis, or to provide the usual carburetting equipment, and to operate with oil during peak periods, and to be used on blue gas (at half the peak thermal output) synthetically enriched during the remaining time. Actually, the ability to double the thermal output at times of high demand by the use of oil was so valuable as virtually to compel the installation of carburetting equipment so long as oil remained available.

Without detailing the calculations, the incidence of capital costs per therm were estimated as follows :—

" Normal " C.W.G. plant producing 500 C.V. gas at load factor 250 max. days per year, 0.5d. per therm.

" Normal " C.W.G. plant producing 500 C.V. gas at continuous full load (say) 350 max. days per year, 0.36d. per therm.

Combination plant, producing 500 C.V. gas, 250 days per year on methane enrichment and 100 days per year with oil, 1.11d. per therm.

B.W.G. plant with methane enrichment at continuous full load, 1.28d. per therm.

Operating Costs

Operating costs had been somewhat more difficult to assess, as the amount of labour, heat and power to be expended upon the running of the organic sulphur removal plant, the methane synthesis plant, and the CO_2 removal plant could only be matters of very approximate estimate in the absence of any data from commercial scale experience. Similarly, the extent to which reaction heat could be usefully recovered had yet to be ascertained in practice. It would seem possible, however, that taking production costs of blue water gas (without capital charges) at 6d. per therm, the upgrading of such gas to 500 C.V. by synthesis would result in a therm costing about 9d.; again without capital charges.

On the other hand, the corresponding cost of a therm of C.W.G. at 500 C.V. was under 7d.

For the costs of the two processes to reach equality, either the price of oil must rise by about 6d. per gallon, or the price of coke must fall below half its present level: if relative capital charges were taken into account, even more drastic changes in the prices of oil or coke were necessary.

While the possibility of such movements could not entirely be excluded, his Company had reluctantly decided that the expenditure of a large capital sum upon a process still in its earliest stages could not possibly be justified in present market conditions, and the synthesis project had accordingly been shelved for the present.

He had gone into some detail, as he felt that the Board were entitled to know that the industry was anxious to make practical use of their work, and that where it had apparently failed to do so, it was by no means from lack of interest or indifference.

While the commercial application of methane synthesis in external plants might well be somewhat remote, its production in generators of the Lurgi type might offer greater promise.

Since one of the major disabilities of the Lurgi process lay in the cost of oxygen, one was tempted to suggest the possibility of constructing a water gas generator, to work on the familiar cycle of air blow and steam run, but arranged so that after a blow at normal air pressures of 30 in. to 40 in. w.g., the steam reaction took place at a pressurae of 20 atmos. or more. Engineering difficulties of construction would, do doubt, be formidable, but the reward of success would be no less great.

Whatever might prove to be the ultimate answer to the problem of complete gasification to 500 C.V. or more, he was convinced that an answer must be found, and he wished the Board to realize that the industry was following their work with the keenest interest, and with cordial goodwill.

Present Day Problems

Mr. **H. Stanier** (South Metropolitan Gas Company) said he had read the Director's report for 1947 with interest and must congratulate him on presenting so comprehensive and informative a summary of the work of the Board. He believed that some criticism had been made in the past that the investigations carried out had been mainly of a long-term nature and not related to the present-day problems of the gas industry. This most certainly could not be said of the work now being undertaken, touching as it did on so many aspects of gas manufacture, distribution, and utilization.

There were just a few detailed comments he would like to make on one or two items in the report. With regard to purification, he noticed that except for one or two outstanding problems the work on the catalytic removal of organic sulphur compounds had been discontinued. This was perhaps as it should be in view of the results now being obtained from established catalytic processes, but he would like to point out that according to published information none of these processes was being operated at a temperature much below 400° C. The Gas Research Board, in his opinion,. had been right in choosing catalysts to work at temperatures of 300° C., or below, for at such temperatures little trouble arose from carbon deposition. In his own Company they had long been interested in reducing the working temperature, but until recently they had not been able to achieve their object without at the same time synthesizing mercaptans. By a suitable combination of catalysts they had now overcome this trouble and a pilot plant working at a temperature of 285° C. had so far been in continuous operation for six months, completely removing all organic sulphur except thiophen without any need for aerating the catalyst. He was afraid that all these catalytic processes, however technically perfect they might be, were bound to be rather costly owing to the need for heating large volumes of gas to the reaction temperature and he suggested that more attention might profitably be given to a study of wet processes of purification.

In regard to the purification of gas from hydrogen sulphide, he was pleased to see a reference in the report to the need of a fluid method and felt that some investigation of the several existing and proposed wet methods of purification would be fully justified. Admittedly, oxide purification also warranted investigation as the plant already installed was likely to remain with them for some long time, but there were occasions when plant had to be replaced by reason of obsolescence and at such times it should be possible to take advantage of any wet process of purification which had been proved economic.

Extraction of Sulphur

With regard to the extraction of sulphur from a normal spent oxide, he was in agreement with the statement in the report that solvent extraction, even with high boiling solvents, was not likely to yield sulphur of a quality to command a high market value without some subsequent purification. He would be interested to know, however, whether any experiments had been made on the extraction of spent oxide which had been protected from tar and similar impurities by an efficient electrostatic detarrer, as this might be expected to give a much purer product.

Another item of interest to him in the report was the proposal to evaluate the effects of using clean coal. There was no doubt that coal users, and in consequence coke users, had suffered considerably from the increase in non-combustible mineral matter resulting from the changed methods of mining. It appeared, however, that the National Coal Board proposed to rectify this by using wet methods of coal cleaning, which while reducing ash would materially increase the water content. Everyone in the carbonizing industries who had to deal with run-of-mine coal knew how seriously excessive moisture could affect the carbonizing process. With increase in moisture the bulk density of the coal was decreased, and consequently plant output reduced, a serious matter in these days of shortage of plant and of labour to operate it. Also extra fuel was required to evaporate the water and a heavier load was thrown on condensing plant and finally a greater volume of more dilute ammoniacal liquor had to be disposed of, thus intensifying a problem which was already difficult and more often than not involved expenditure rather than revenue. All these points needed to be borne in mind when considering the evaluation of clean coal.

Finally, he would not like to close his remarks without making some reference to the work on the gasification of coal in hydrogen under pressure. The Gas Research Board had pioneered this work and quite promising progress had been made. Much of the value of the work, however, must depend on the economic production of hydrogen at the required pressure, and he was glad to see that there were now to be some investigations made into the operation of a semi-scale plant for the pressure gasification of carbon in oxygen and steam.

Close Collaboration

Dr. **A. C. Monkhouse** (Deputy Director, Fuel Research Station) said the report of the Director covered a very wide field of research, and he was to be congratulated on the admirable summary of the main features of the work. The difficulty of undertaking and co-ordinating research was a real one, and the new headquarters, when completed, would be of great benefit in bringing some of the scattered sections together.

In these days of limited man power it was important that all research workers on fuel should be in close touch with each other and know what work each was doing. There had been close collaboration between fuel research of the Department of Scientific and Industrial Research and the Gas Research Board, which had been of great mutual benefit. An example was the work on methane synthesis which had been started under Dr. King when he was at the Fuel Research Station, and had been developed by both organizations under a Joint Committee. The work at the Fuel Research Station was outlined in the present report. It had been decided by both organizations that the programme should be brought to a conclusion as the work had now reached a stage at which it could be applied on a practical scale when circumstances were considered favourable.

Suitable catalysts had been found, also a type of unit which could be multiplied to a full scale, and methods had been developed whereby the heat of reaction could be used to provide steam

under pressure. He would like to mention briefly certain sections of the report which were of particular interest. It was not possible to deal with all the sections. The work on the organic sulphur compounds in town gas was particularly valuable, especially the survey made at various gas-works, operating with different coals and under different conditions, and should prove of great value to industry.

The work on oxide purification—a very vital part of gas-works practice—was important and he was very glad to learn that work was in progress for the recovery of sulphur from spent oxide. Spent oxide was not a very welcome source of sulphur to the acid manufacturer because of the impurities such as tar and ammonia compounds present in the oxide. When it was realized that half of the sulphuric acid of the country was made in contact acid plants, that this proportion was increasing, and that a high proportion of these plants used sulphur as a raw material, there was great scope for the gas industry to produce sulphur of such purity as could be used in these plants. This was of particular importance to-day, as the sulphur was obtained from dollar countries.

In the section on effluent problems no reference was made to phenol recovery. Although it was known that in the past the industry had carried out work on this subject, and that there were established processes for phenol recovery operating successfully in this country, there would appear to be scope for improvement in the existing processes, both in solvents used and in the type of plant.

He would like to stress the importance of the Intelligence Section of a research organization. This part of the work might not be spectacular, but it did provide rapidly and efficiently basic information for the research worker and for industry. Their Intelligence Section at the Fuel Research Station was responsible for the publication of "Fuel Abstracts," and the help of many organizations, including the Gas Research Board, was acknowledged in the task. No one to-day, even with unlimited time at his disposal, could cover all the journals and papers on subjects in which he was interested, and abstracts and summaries played a very useful part in providing research workers and industry with up-to-date information.

Investigations at Liverpool

Mr. **H. H. Thomas** (Liverpool) said one was first impressed by the scope and range of subjects under examination by the Board, especially so when the implications of the experimental work involved were appreciated; all were matters of profound importance, though individual interest would concentrate on particular subjects. It was especially pleasing to find that it had been possible to provide for the investigation of the iron oxide purification process, and the study of coke breakage in addition to the other projects concerned with coke production. Both were immediately urgent problems, the conclusions potentially being of very considerable value to the industry.

They, in Liverpool, had been privileged along with other undertakings to co-operate in the preliminary review of the purification process; this matter would be more completely summarized by Dr. Dent when the investigation had progressed further, but his impression was that it would be difficult to visualize a more complicated variety of plant, theories, procedures, and achievements than was shown by that review.

In Liverpool they had attained some success in controlling the cost of the process, but they certainly suffered from caking of the oxide. The possible reasons for caking were enumerated in the report and it was indicated that any, or more probably a combination of, factors might contribute—certainly they found that a long box life with low rate of sulphur increment resulted in extreme hardening. Low box life with high rate of sulphur increase, indicating operation at optimum load, would seem to minimize hardening; in a particular case, however, with more than one stream of only four boxes in parallel it was usually found necessary in practice to vary the load on each series in turn, so that the individual box life was intended. This procedure was largely determined by the maintained properties of the purifying material—a factor which had a profound effect upon the process and concerning which relatively little was known.

A trial had been commenced at Liverpool in which various materials would be used with a constant flow to obtain data on this point. In these circumstances they had experienced a rather considerable fall in the activity of the first material used after a relatively short life by previous standards; the amount of sulphur which had been added to the box was, however, quite considerable. The experiment was not complete and the conclusion must await further performance and the inspection of the charge.

They would of necessity use solid purifying material for some time to come, but it seemed possible that some portion of the H_2S might, with operating advantage, be removed in a liquid medium. The previously known liquid processes did not remove the sulphide to oxide box standards; a combination of the two using oxide for the last traces might well provide a satisfactory solution.

The "Manchester" Process

An experimental plant operating the "Manchester" process was to be installed at Liverpool, the intention being to examine the method on the works scale. The prototype plant was considered to be operating successfully at the Rochdale Road Works and some modification of that arrangement would be adopted in the Liverpool installation. If the Board might find it possible to extend the investigation to this process his Company would be pleased to provide the necessary facilities.

The conclusion of the surveys upon organic sulphur distribution and of the variation in gas combustion characteristics was reported and the extent of current knowledge of these subjects was thereby defined; the final reports, GRB 33 and 34, provided a basis upon which a future policy could be planned; it would be noted particularly that some assistance in the reduction of organic sulphur would be obtained with improvement in coal quality. The extent to which sulphur should be reduced had perhaps previously been agreed—the report confirmed that conclusion and indicated the processes which were available for the purpose.

The progress of the gas combustion research at Leeds would be noted as it proceeded, and in the meantime it would be wise to ensure minimum variation in gas quality by means of the A.T.B. The report emphasized the empirical nature of this instrument, but in the present state of knowledge of the subject its application could provide a very considerable improvement in the control of variations.

So far as coke was concerned they had the Domestic Fuel Policy Report upon which to develop, and the current coke position was in some cases conducive to the development of the domestic market. Energy should be directed towards preparing a coke of the highest possible quality such that it might be satisfactorily burned in an open grate. It seemed that for the time being they must proceed as a two fuel industry, the economy of the gas-coke combination for the domestic heating having been demonstrated. Unfortunately the Simon Report had not defined the quality of the coke which it suggested should be diverted to domestic use, but it might be assumed that some effort would be required to provide a fuel acceptable to the average consumer on the scale which was visualized in the report. A good deal could be done in that direction by carbonizing selected low ash, metalignitous coal under controlled conditions. The collaboration between the Board, the L. & C.C.A., and the N.F.G.C.A., would no doubt lead to sound and valuable conclusions on these matters.

Flame Properties

Mr. **R. F. Hayman** (Gas Light and Coke Company, Watson House) said Section VI of the report discussed the nature of the outer boundary layer of a methane flame and suggested that it might be a sheath of hot air, or air-gas mixture, or a less active zone of combustion. There was now available flame failure equipment which depended on the principle that flame was a conductor of electricity, and so long as the electrode was immersed in a zone of conducting gases the circuit was maintained. Extinction of the flame resulted in instant shut down. It had been found, however, that the circuit was not broken if the electrode was removed from the flame and the tip was held in the hot gases surrounding the edge of the flame, indicating that the resistance through the flame to the earthed burner was of the order of 10 to 50 megohms.

He did not know whether town gas possessed the same characteristic boundary layer as methane, but this experiment suggested that the boundary layer of a stream of burning town gas could not be hot air or air-gas mixture, but must be some conducting gas. The equipment used could be made sensitive to certain ranges of flame resistances and he suggested that if it was possible to obtain correlation of any sort between the electrical resistance and the composition of a flame a study of the electrical properties of this boundary layer might give valuable information.

Vice-President's Tribute

Mr. **D. M. Henshaw** said he was sure that if Sir Ernest Hiley could have been present he would have expressed appreciation of the work that had been accomplished during the year. He could do that service for him and he also expressed on his own behalf his high appreciation of the work that had been done by the Board. He wished to stress the point made by Mr. Crowther that it was becoming more important that the operating engineers and their staffs, rather than the Gas Research Board itself, should make use of the information that became available as the result of the research work. With both short-term and long-term research there was so much material available that the Council of the Gas Research Board certainly could not be accused in any way of neglecting the interests of the industry. It should be appreciated that much useful work was being done, and they might well be much nearer the emergence of important changes and improvements in the technique of gas manufacture, purification, and utilization than might appear at the present time. He hoped that those people who were now contributing to the funds of the Gas Research Board would make good use of their opportunities and take a proper interest in the work that was being done. He hoped that in the future they would, under the guidance of what might be a new set-up of the gas industry, see much more use made of the work of the Gas Research Board than had been the case in the past.

In the early days there was a considerable amount of frustration by reason of the fact that a staff had to be created under very difficult conditions in the early days of the war. It was almost impossible to get the right staff, and that was still, to some extent, a great difficulty. If the members of the Board could have a statistical digest of the amount of time put in by the members of the Council and the sub-committees during the year they would be amazed to find that people who were very active in their own spheres devoted so much time to the work so ably carried out under the direction of the Chairman of the Council and the Director.

The **Chairman** thanked those who had contributed to the discussion, particularly Mr. Henshaw. He thought that from the point of view of the staff of the Board it would transpire that this had really been a most helpful and constructive discussion. They had had at least three very fine examples from Mr. Crowther, Mr. Stanier, and Mr. Thomas, of the inter-relationship between research of the kind the Board had been conducting and the severely practical and economic considerations which must prevail on the gas-works.

Mr. **Norman Hudson** (Mirfield) said he had not intended to take part in the discussion, but the remarks of Mr. Crowther, Mr. Stanier, and Mr. Thomas had impressed him considerably in as much as they had emphasized the opportunities that existed for the contractors and the controllers of gas undertakings to make use of the devices and statistics which had been made available to them by the Gas Research Board. He believed there had been a tendency in the past for gas undertakings in particular to await the *fait accompli* rather than to take advantage of the interim advances. With the limited finances available to the Board it could not be expected that they could carry their fundamental researches beyond the laboratory and pilot plant stages into full scale operation. Having gone so far as the pilot stage the Board should not be asked even to attempt to translate their findings into commercial and economic figures; that was surely the job for the commercial administrator.

A further point that had impressed him was that Mr. Crowther's Company was prepared to take a gamble if the economics appeared at all favourable. Liverpool had decided to take a gamble and from his own point of view he might say that his Company had on occasions taken a gamble. So far it had been worth while. He would therefore not only thank the Director for his report but, in addition to what the Chairman had said, he would also like to thank those people who had intimated that they were prepared to consider pilot results and translate them into practical plant on their own works with an element of gamble about it.

Effluents Problems

Mr. **J. H. Dyde** (South Eastern Gas Corporation) said he only wanted to make two brief points. The first was in connexion with the effluents problem. He had had experience in the last two years of a local authority becoming very conscious of their powers under the 1937 Act regarding the disposal of trade effluents. That Act came into operation just before the war, and it was only now that the authorities were beginning to realize what powers they had. Four of the companies with which he was associated had been in difficulties with their effluents. There had also been a good deal of correspondence and some special articles in *The Times* regarding the cleaning up of our rivers and water courses, and he felt that the time was coming when the gas industry would have to intensify its attention to the duties placed upon it with regard to the treatment of its effluents. In the last few days he had been dealing with a particularly difficult case at one of the companies in the South Eastern Corporation, and he would like to feel that this most important subject was not being lost sight of, but rather that its magnitude was appreciated. They all deplored the death of Dr. Eastwood, who did so much work in that connexion. It might be desirable to consider whether or not the time had come to pass over the work of the Liquor Effluents Committee of the Institution of Gas Engineers entirely to the Gas Research Board.

The second matter to which he wished to make brief reference was the report concerning the behaviour of refractory materials in carbonizing plant. They had had evidence in the companies associated with the South Eastern Corporation of what appeared since the war to have been a depreciation in the general quality of refractory materials. Two forms of failure of refractory material had made themselves evident within his own experience in the last two or three years, an outstanding example being in a setting of vertical retorts which had been let down at Slough. Before the setting was dismantled he hoped it would be possible for an inspection to be made by the technical staff in the refractory section of the Gas Research Board. There was in the first 6 to 12 ft. from the top of the retort a very fine example of flaking, and he was fairly certain that it was due to the explanation put forward in the report, namely, that the scurf adhering to the refractory material had a different co-efficient of expansion, and that the scurf was mechanically stronger than the retort material. There was inevitably some destruction of the refractory material at the point of scurfing. This had been accentuated by the replacement of a softer type of siliceous fireclay where before the war they used a harder quality, with greater mechanical strength.

The second failure was that of erosion or slagging at the base of the retort. They had unfortunately had a number of very clear examples of that type of attack, and his theory rightly or wrongly was that it was due to alkali attack. They had had an increased amount of saline material in their coal, particularly that from the Derbyshire coalfield, and he felt there was a strong suggestion that the sodium chloride passed to the cooler portions of the coal and then went down with the charge. Consequently the base of the retorts got an accumulated or increased concentration of sodium, and the sodium, of course, attacked the refractory materials. He mentioned these points in the hope that the Gas Research Board would be able to send representatives to help them in their difficulties.

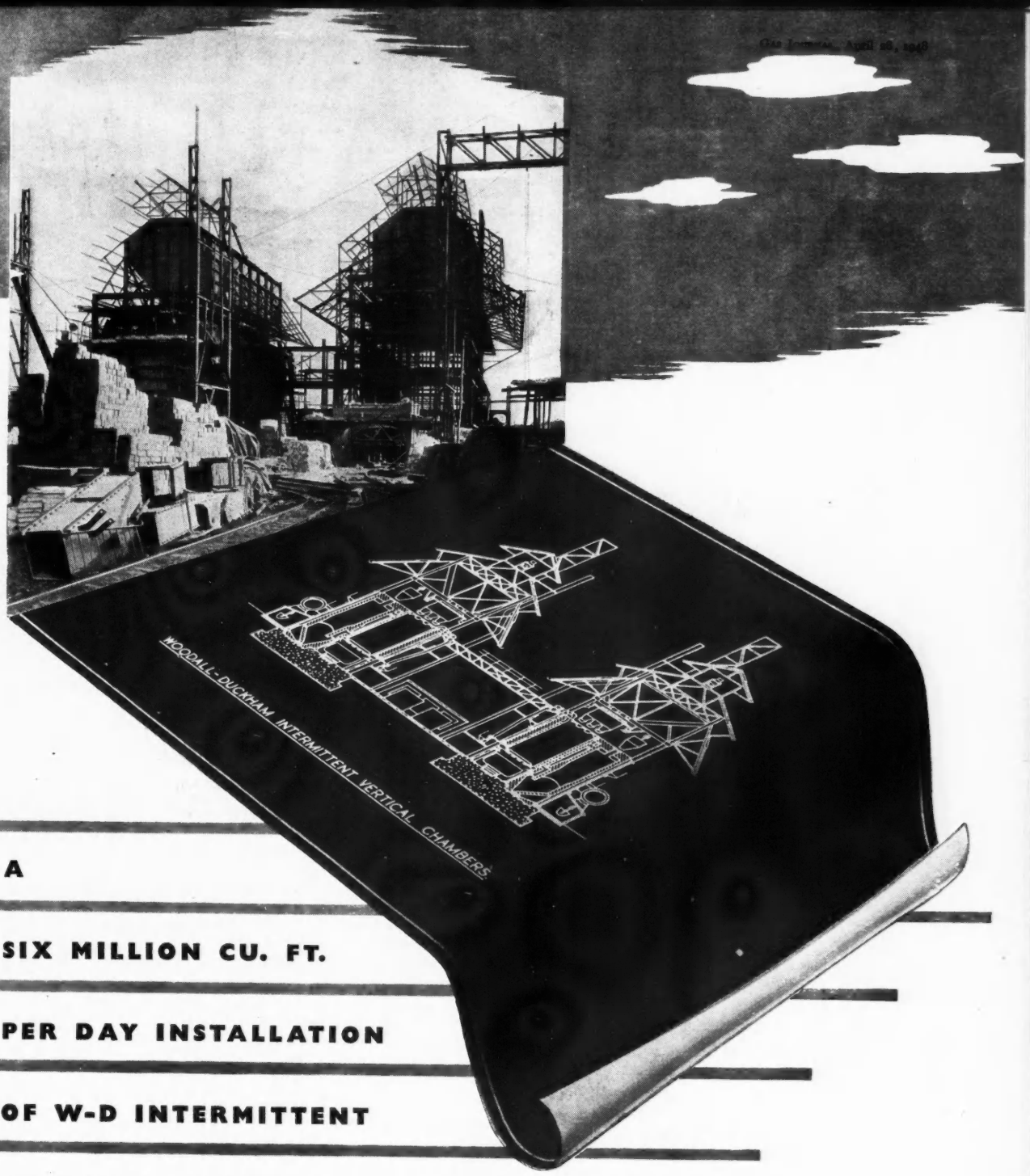
A Brief Reply

Dr. **King,** in a brief reply, said there was no time to do justice to the many valuable observations that had been made on the report, and he would prefer to present a considered reply. He was, however, particularly gratified by the many kind things that had been said about the report and the method of presentation. Probably some of the remarks had been too kind, and it might have been more helpful if members had criticized it. He was sure every member of the staff would be gratified to feel that their efforts had been so much appreciated. He was particularly pleased at the suggestions that had been made for the translation of the results of their work into practical things. Mr. Crowther had given an excellent example of an attempt to make use of the work which had been going on not only in the laboratories of the Board, but also at the Fuel Research Station for a number of years and he promised that he would spend time looking into the figures to see where their research work fell short of achievement. Mr. Crowther had said that they had not worked out how far the reaction heat was to be utilized. It had always seemed to Dr. Dent and himself that in any attempt to apply methane synthesis it was absolutely necessary that it should be done from the thermal point of view or it would have no chance at all of achieving technical success. In other directions Mr. Thomas and Mr. Stanier had shown how the more practical aspects of their work could be examined currently with their own production on the works.

Progress had been made in the application of the fluidization technique in complete gasification and in the manufacture of synthesis bases. In the manufacture of oil from coal a move had already been made in another direction in the United States, where coal, oxygen, and steam were injected into the reaction chamber. He had seen some preliminary results and it looked as if the application of the fluidizing technique to the manufacture of synthesis gases might be well worth while. He need hardly say that what Professor Roberts had said about collaboration in their research programme was heartily endorsed by the members of his staff. Two written contributions to the discussion had been received, one from Mr. Keillor, of Greenock, on combustion research, and one from Dr. Marsden, of Bristol, who said they had not gone far enough in their work on the removal of organic sulphur compounds from coal gas. He was not satisfied with their explanation that thiophen could not be dealt with, and would like them to do some more work in that direction. In reply to Mr. Dyde the difficult question of effluents was under consideration by the Council and something would be done to increase their activities in that field if it was necessary. He could assure Mr. Dyde that they would do all they could to help him in both his problems. Finally, he promised to reply in greater detail later.

The Exhibition illustrating the work of the British Council, which was seen by the King and Queen during their recent visit to the Council's offices, will be open to the public at 40, Grosvenor Square, until May 8, daily 11 a.m. to 5 p.m. (Sunday 2.30 p.m. to 5 p.m.). The exhibition will later be shown in the provinces.

With the Ending of a 21 days' unofficial strike of maintenance men in the Coventry Corporation Gas Department for a wage increase of 3d. an hour, it became known that the gas supplies had been in danger of serious curtailment on several occasions during the past three weeks through major failures of plant. Supplies were maintained without interruption due to the success of the engineering staff in carrying out repairs and essential daily maintenance work. The Corporation, which indicated that it considered the men had made out a case for an increase, was endeavouring to find a means of raising wages within the framework of the national agreement when the strike started, and refused to continue negotiations while the men were out, insisting that constitutional procedure must be observed. The men went back on Thursday to enable discussions to take place between union representatives and the Corporation Salaries Committee, a meeting of the two sides is taking place.



A

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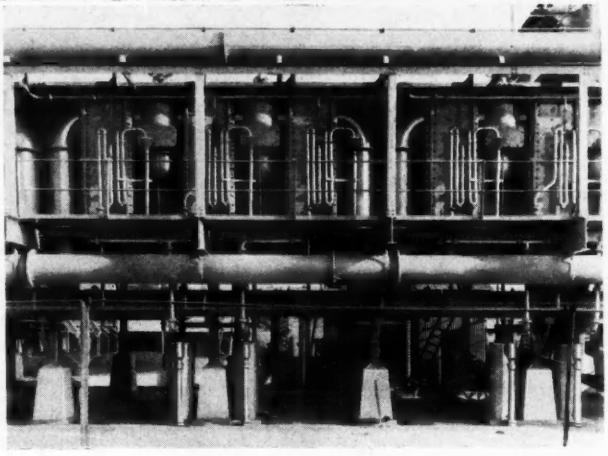
Gas Purifying Plant

The installation of this gas purifying plant was recently carried out for the Farnham Gas and Electricity Company by Newton Chambers.

The plant consisted of four cast iron purifier boxes each 20 feet square and 6 feet 6 inches deep on a substructure arranged to give 9 feet headroom.

Newton Chambers are prepared to submit schemes covering special requirements and incorporating any desired arrangement of gas connections and valves.



Each box is provided with two 3-way reversing valves fitted with hemp packed discs, whilst the rotation of the boxes is controlled by hydraulic valves, three to each box.

NEWTON CHAMBERS

SPECIALISTS IN THE DESIGN AND CONSTRUCTION OF GAS PURIFIERS

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GAS RESEARCH BOARD LUNCHEON

THE annual luncheon of the Gas Research Board was held at the Savoy Hotel on April 20 under the Presidency of Viscount Falmouth. Among the principal guests were Dr. B. Mouat Jones, Vice-Chancellor of the University of Leeds, Sir Henry Tizard, Chairman of the Defence Research Policy Committee, Sir Robert Robinson, President of the Royal Society, Major W. Gregson, President of the Institution of Mechanical Engineers, Dr. Harold Hartley, President of the Institution of Gas Engineers, Mr. A. E. Sylvester, Chairman-designate of the Gas Council, and Messrs. A. Bolzinger and B. de Comminges, of Gaz de France.

Dr. **B. Mouat Jones,** Vice-Chancellor of the University of Leeds, in a humorous speech, proposed the toast of the Gas Research Board and said the University had a long and intimate contact with the gas industry over a period of some 40 years. The question of how the universities and the research associations could between them contribute to the progress of the industry was one which he imagined would be much in their thoughts as they contemplated taking over their new headquarters at Beckenham. It was a question which did not lend itself to any generally agreed formula, because the word research had an almost infinite variety of meanings, any of which might be sharply distinguished from any of the others. There was no hard and fast line between pure and applied research, and it was better to look not at the nature of the research work but at the outlook of the research workers. The difference between the applied researcher and the pure researcher might be roughly summed up by saying that the applied researcher knew the answers before he started and the pure researcher did not know the answers until he had finished.

In his view one department of a research organization should be devoted to development—the development of ideas that came from the industry. A definite function of a research association was to have a strong development section, and that was possibly much more easy and fraught with less difficulty in the case of a nationalized industry than in the case of a research association dealing with an industry that was not nationalized and that was dealing with competing interests. Going further, he felt there must be a place for fundamental research. If fundamental research was excluded from the research associations such exclusion could only accentuate the divorce which had existed in the past between pure and applied scientists—a divorce which had been a weakness in our industrial system.

The research associations must be able to attract and keep the finest research brains; they wanted men who could speak and talk the same language as their scientific confreres at the universities and elsewhere. They wanted men who could seize on new ideas and use their possibilities for development. The research associations really needed three things—*ad hoc* research, development research, and fundamental research. The Joint Research Committee of the Gas Research Board and the University of Leeds performed its functions extremely well, and he hoped it would continue to do so in the future. He hoped the University and the industry would maintain the relationships that had existed for so long and that they would go from strength to strength.

A New Target

The **President,** in responding to the toast, said the Gas Research Board was a comparatively young body. It had just produced its ninth annual report and had just finished its first quinquennium as an association qualifying for a D.S.I.R. grant. It had had a target of £20,000 for its first quinquennium, and he was glad to be able to say it had practically reached that target and had now started on a second quinquennium. The D.S.I.R. had set the Board a higher target, and it was now told that it must reach £32,000 before it could become a grant-earning institution. Its members had agreed to contribute a further £7,000, apart from the gift of one big contributor, and another group of contributors had promised that they would increase their subscription by £5,000. They were, therefore, able to start hopefully, and he hoped they would be able to earn the additional grant from the D.S.I.R.

Taking 1943 as their basic year and counting the subscriptions for that year as 100, the same ratio of subscriptions to-day was 160, and they were budgetting for 250 for the coming year. These figures showed how interested the gas industry was in its research organization, and how determined it was to support it in every way. The Gas Research Board started just before the war, and had great difficulty in finding a home in which to carry out its work. At long last they had, as was mentioned in the report, acquired a property at Beckenham which, with some alterations, would he hoped meet the requirements of their work. Again like many other bodies they had great difficulty in collecting adequate staff and, in fact, the numerical strength of the staff had decreased during the past year. These circumstances inevitably caused the Director considerable anxiety in carrying out the extensive research programme which he had envisaged, and they all owed him and his staff a debt of gratitude for the fact that they had achieved so much in the face of difficulties.

We Lead the World

They had been helped by many others. They had been associated with the Leeds University for a great number of years, and he would like also to mention some of their industrial friends. The Bournemouth Gas and Water Company had been most helpful in providing the Gas Research Board with accommodation for carrying out a lot of their essential work. Although the Gas Research Board was a relatively young body he did not want guests to go away with the idea that the gas industry was not interested in research. For a great number of years they had had a chair of gas engineering—the famous Livesey chair—in the University of Leeds, and for many years the industry had spent about half a million in carrying out research in one direction and another. Some of the large gas undertakings had admirable research laboratories of their own in which excellent work was carried out. The manufacturers of appliances, whether builders of retorts or makers of small specialized gas equipment, were all very well served by their own research establishments, and it might fairly be claimed that this country led the world in many directions in relation to the gas industry.

The subjects which the Gas Research Board had to cover were varied, and embraced the production of gas, its purification and storage, coke production, refractories, effluents problems, and so on. Later in the day the staff of the Gas Light and Coke Company were to present a paper dealing with the production of peak load gas by the partial combustion of oil, a matter which might be of considerable assistance to the gas industry in dealing with peak load problems. It would be interesting to speculate on the future of the industry. The time might well come when all solid fuel would be carbonized before it was used. All such things were matters of speculation, but he was sure that the Gas Research Board would continue to be a very important factor in the national economy.

Lord Falmouth went on to propose the toast of the guests and extended a special welcome to Mr. Sylvester and Colonel H. C. Smith, "the new commissars who are going to manage the industry."

Engineer Vice-Admiral Sir Harold A. Brown, Chairman of the Fuel Research Board, responded for the visitors.

Outside the Aluminium House in Piccadilly, erected in aid of the Margaret McMillan Memorial Fund. Mrs. C. R. Attlee is seen performing the opening ceremony. Left to right: Mr. Leopold Friedman, Managing Director of De La Rue Gas Development, Ltd (Chairman of Exhibition Committee), Mr. G. Goddard Watts (Chairman of Publicity Committee), Councillor Hal Gutteridge (Mayor of Westminster), Mrs. C. R. Attlee, Mr. Arthur J. Cousins, O.B.E. (Chairman, Odhams Press), Mr. Charles Davies (Chairman, Arding & Hobbs, Ltd), Mr. Simpson (Assistant Managing Director, Arding & Hobbs), and the Hon. Greville Howard (Deputy Mayor). Completely furnished throughout, with a gas-heated kitchen, the house is creating great public interest.

The Glastonbury and District Gas Company, Ltd., commenced taking full bulk supplies of gas from Weston-Super-Mare on Mar. 30.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS

Presidential Address* of H. S. Milne, Aberdeen

MUCH of my time during the past few years has been devoted to engineering matters, and for this reason, and as it is now 36 years since any reference has been made to the Aberdeen Undertaking in a presidential address, it may be of interest to consider some of the changes which have taken place there in that time.

Then the gas-making plant consisted of horizontal and inclined retorts, together with a small C.W.G. plant. The condensers, scrubbers, and purifiers were of simple design, and for the most part made by local engineering firms. At that time, with an annual make of under 900 million cu.ft., it was considered that the limit of the gas-making potentialities of the works site had been reached, but with the advent of continuous vertical retorts and the installation of one of these plants in 1913, the situation was completely altered. By 1930 the whole of the gas was being made in vertical retorts with a total gas-making capacity of 8¼ million cu.ft. per day compared with the 4 million cu.ft. per day of the plant which had been replaced.

The cramped nature of the site made it difficult to extend the existing purifiers and washing plant, and in 1928 overhead purifiers having a capacity of 2¼ million cu.ft. per day were erected on a site towards the west end of the works, a site which had been made available by the dismantling of a holder some time before. These purifiers, together with duplicate exhausters, Livesey washer, rotary scrubber and Connersville meter, formed a completely new gas stream from the outlet of the existing condensers.

By 1939 the annual gas make had increased to 1,891 million cu.ft. with a maximum daily output of 7¼ million cu.ft., and it was clear that the time was again approaching when plant extensions would become urgent. At that time an area of ground extending to about four acres and lying to the west of the works was being cleared of old property with a view to its being utilized for the erection of blocks of flats. No building work had, however, been started when war broke out, and in view of the proximity of the area to the docks and industrial plant, it was decided that the erection there of dwelling-houses should not proceed.

Arrangements were made to have this ground transferred to the gas undertaking and to lay a railway across the main bus route which separates the ground from the works. Some two acres which were immediately available were enclosed and used for coal storage, so easing the congestion within the works and permitting of more effective use of shovels and other mechanical plant in the stocking and reclaiming of coal. It is intended in time to transfer the major part of coal siding and storage space to the new ground, and this decision has made clearer the lines which future developments within the works can follow.

Advantage was taken, when reconstructing the No. 2 vertical retort plant in 1942, to divide the bench into two independent parts to facilitate future repairs, and a similar procedure had had to be adopted later, but at the expense of a pair of retorts, when No. 3 plant was reset in two stages. The carbonizing plant now consists of five benches of approximately equal size having a total combined capacity of 10½ million cu.ft. per day.

By 1944 the condition and inadequacy of the washing and dry purification plant was causing considerable concern, as, apart from the new west section provided in 1928, most of the plant was from 50 to 75 years old. Consideration had therefore to be given as to how best to replace and extend the old plant without causing interruption to gas-making, but as there was no possibility of finding an alternative site we were faced with the unpleasant prospect of having to scrap before we could rebuild.

The plant which had to be replaced consisted of tower scrubbers, rotary washers, oxide purifiers, and station meters, all very old and connected in a somewhat haphazard manner. The compact arrangement and proved efficiency of modern washers and meters made it possible for these to be accommodated and erected without interfering with the working plant, but the matter of the purifiers was less simple.

The purifier house was solidly built in granite and contained a revivifying floor measuring approximately 175 ft. long by 114 ft. wide. This floor was supported on a common boundary wall which formed the south side of the building and by three rows of columns which served to divide the house into three bays. Below the revivifying floor and in the rearmost or south bay were accommodated seven small purifier boxes at ground level, the four boxes of "C" range and three of the "D" range. The remaining box of "D" range and the four boxes of "B" range were in the middle bay, while in the north bay were the four 33 ft. square boxes of "A" range. The boxes of these four ranges all had water lutes varying in depth from 18 in. in "C" range to 24 in. in "A" range; and as the ranges were operated in parallel, the blowing of a lute was a fairly frequent happening when on heavy load. The fact that the centre valves controlling each range would only permit of the boxes being worked in series of three with one box off meant that with each rotation one box had to be emptied and refilled, and while this ensured that back pressures were seldom excessive the labour involved was considerable.

As the purifiers were operating at full capacity over the winter, it was clear that none of the existing plant could be put out of commission before first providing some margin to compensate for the loss in capacity which would result. The two things which had to be kept in mind in this connexion were the need for reducing back pressure to a minimum and for obtaining the most efficient purifying conditions in the available plant.

After giving very careful consideration to the various factors involved, it appeared that, provided an immediate start could be made and the work was carried forward at top speed, it would be possible to divide the work up into three stages, each complete in itself, to be undertaken in three sucessive years. The three stages were as follows:—

Stage I (1945).—Installing 5 million cu.ft./day horizontal water tube condenser, electrostatic detarrer, and static ammonia washer. Installing one 6 million cu.ft./day Connersville meter and modifying existing "A" range and west purifiers.

Stage II (1946).—Dismantling "C" and "D" range purifiers, together with south section of the house and revivifying floor, and replacing with a set of four overhead boxes contained in steel framed and sheeted house.

Stage III (1947).—Dismantling "B" range of purifiers, together with the remainder of the house and revivifying floor, and replacing with four overhead boxes with revivifying floor above. Completing steel framed house and extending to include the existing "A" range purifiers.

The following table shows the increase in purifier capacity which it was estimated would be effected.

Work to be done to purifiers	Existing plant: Year of installation	Existing plant: Capacity mill. cu.ft. per day	Proposed plant: Capacity mill. cu.ft. per day	Stage
Modification of "A" range	1903	2.10	2.80	I
Modification of west range	1928	2.75	3.50	I
Replacement of "C" and "D" ranges	Unknown, probably prior to 1870 —enlarged in 1886	1.55	2.70	II
Replacement of "B" range	1889	1.10	4.30	III
Total capacity		7.50	13.30	

It will be seen that Stage I was estimated to provide an increase in capacity of 1.45 million cu.ft. per day or only 100,000 cu.ft. less than the capacity to be sacrificed when carrying out Stage II, while Stage II was estimated to balance any loss during Stage III of the work. There was, however, no margin to work on, and any delay in the carrying out of the work as planned would have had serious consequences. This is amply confirmed by the fact that the actual make of gas over several consecutive days during the winters of 1945, 1946 and 1947, averaged 7¼, 8¼, and 9¼ million cu.ft. respectively.

As has been indicated earlier, the purifying plant had operated with only three boxes in series, and it appeared that the capacity of both the west and "A" ranges could be substantially increased by using four boxes in series and revivifying *in situ*. The west purifiers, which were equipped with rubber sealed lids and were rotated by means of a Weck valve, needed no real modification, but with a view to ensuring greater freedom in operation, it was decided to replace the metal-to-metal valve discs with discs having a greasy packing face and to provide gas heaters and separate air admission points on the inlet to each box. In the case of the "A" range, the centre valve was removed and replaced by a Weck valve arranged in a pit alongside the boxes.

It was decided that the new overhead boxes should be of cast-iron construction, of moderate depth and arranged in series of four, each range of four boxes forming a continuous row. This arrangement involved no waste of space, and as all connexions ran beneath the boxes and the boxes of Stage III were cantilevered some 3 ft. over the existing "A" range, it was possible to accommodate 6 ft. 6 in. deep boxes measuring 37 ft. 6 in. by 25 ft. and 39 ft. by 39 ft. for Stages II and III respectively.

That the boxes were not more nearly of a size was due to the necessity of retaining the supports to the revivifying floor in the adjacent bay during the construction of Stage II, as the use of this floor was essential to the working of the "A" and "B" ranges. The existing cast-iron columns supporting the revivifying floor were at 19 ft. 6 in. centres, and as these could not be interfered with during Stage II of the work, it was decided to adopt the rather close centres of 9 ft. 9 in. for the main supporting

* Presented at the Spring Meeting at Perth, April 9, 1948

stanchions in order that these could be erected with the minimum of disturbance to existing foundations.

Although the existing purifier house was of massive masonry construction and appeared to be in reasonably good condition, it was known that the foundations were shallow, and in view of the age of the building it was decided that in the main it would be dismantled and that no loads from the new plant would be carried by any existing work.

At this point it would be as well to describe the general arrangement of the plant, and for convenience Stages II and III will be taken together. The boxes are arranged some 14 ft. above the ground and are connected on top to provide a continuous platform. Over the Stage III, or centre range of boxes, is a reinforced concrete revivifying floor cantilevered about 16 ft. over the "A" boxes to facilitate the filling of these and measuring 153 ft. 6 in. by 55 ft. Alongside this concrete floor and connected with it are chequer plate platforms along which

After the meeting in the Lesser City Hall, Perth. Left to right: J. M. Dow (Paisley) Immediate Past President; Dr. Harold Hartley, President of the Institution of Gas Engineers; J. Dow; H. S. Milne (Aberdeen) President; Dr. W. T. K. Braunholtz, Secretary of the Institution; D. D. Melvin (Edinburgh) Senior Vice-President; Duncan Fraser, Lord Provost of Aberdeen.

special barrows can be wheeled for filling the Stage II boxes, while at each end of the house there is a staircase and 20 cwt. barrow hoist.

The house structure is extended to cover the existing "A" range of purifiers in such a way as to permit of these being dismantled and replaced by a duplicate of the Stage III range at a later date. The south side of the house is closed by protected metal sheeting down to the top of the boundary wall while the ends are sheeted to the revivifying floor, and the north side to a somewhat lower level. All gas connexions to the plant are 24 in. diameter; the inlet, outlet and return mains being just below the boxes. On the inlet and outlet of each set is a "U" bend, which can be water sealed to isolate the plant. Each box is controlled by three valves, a total including the main inlet and outlet valves, of fourteen valves to each range, six of which have to be operated for each rotation of the boxes.

Adjacent to the purifier house an instrument room has been provided to accommodate the instrument panel and air compressors, one compressor to supply air for the Stages II and III plants, and a second to supply air to the west and "A" ranges. The instrument panel is arranged for the control of Stages II and III plants only, and is equipped with the following:—Two gas flow recorders, two air flow indicators, one 12 point resistance type gas temperature indicator, two steam pressure gauges, ten water tube gauges, two sequence indicators, one electric clock. The air supply to the "A" and west sections is measured by positive type air meters.

The actual carrying out of the work of dismantling the existing plant and erecting the new purifiers and house without interruption to the operation of the plant or damage to the working boxes was a procedure calling for great care, accurate programming and close co-operation between the contractors and the works staff. Despite current shortages and delays, and the restricted access around the working plant, Stage II was in operation within seven months of the start of dismantling, while 12 months later the much more extensive and complicated work on Stage III was sufficiently far advanced to permit of the purifiers being put into operation—a state of affairs much to the credit of the contractors.

While the work just described has been proceeding, consideration has been given to further developments required in the immediate future, and contracts have been placed for an extension to the carbonizing plant and for additional exhausting, detarring, and washing plant. The detarrer and washer of seven million cu.ft. per day capacity will be of similar type to the plant already installed and alongside which they will be placed. These plants will operate in parallel, a flow indicator being used to ensure that an appropriate proportion of the work is done by each.

The exhauster is to be of the Connersville type rated at 300,000 cu.ft. per hour and driven by a vertical steam engine. This machine will be placed in a house to be erected alongside the existing messroom which it is anticipated will be dismantled at a later date and replaced by an exhauster house to accommodate this and two additional exhausters. By this arrangement it will be possible later to make available the space meantime occupied by the existing east exhausters and to simplify very considerably the layout of the whole of the plant. It is proposed to dismantle the existing and now obsolete tower and rotary scrubbers and pumps, and to replace the 55 years old Babcock & Wilcox boilers in due course by modern boilers on a new and more central site. All this would release a substantial area of ground in that part of the works where it may be reasonable to suppose that plant resulting from present day research and technical development may, in the future, require to be accommodated.

Extensions and alterations at the works have had their complement on the district, and it may therefore not be out of place to describe some of the work done there.

The area of gas distribution lies roughly within a semi-circle the base of which runs north and south with the sea to the east. The works is near the centre of this base with the main holder station at Gallowhill lying about three-quarters of a mile to the north. Trunk mains radiate from the works for the most part in a westerly and south-westerly direction, and from Gallowhill a 20-in. low pressure mains runs north-westerly for a distance of about 1¼ miles. The harbour prevents any large mains being carried southwards from the works.

Until 1937 the whole of the gas was distributed by low pressure, fan boosters being used at the works to increase the pressures thrown by the three two-lift half million cu.ft. capacity holders there. In view, however, of the amount of building development which was taking place on the fringe of the area, it was decided in that year to lay a new main round part of a 4 mile ring road lying for the most part beyond the limit of building development. A spun iron main, with flexible joints, was run due west from Gallowhill to the ring road, a distance of 2½ miles, and was then carried southwards 2¼ miles to the old Bridge of Dee. At a point about 1¼ miles from Gallowhill, the main was reduced from 14 in. to 12 in. diameter after two 8-in. branches had been provided—branches which were carried respectively to a central point in the town and to the north end of the ring road. At the ends of these branches and at four points on the ring road, 8-in. and 6-in. governors respectively were provided which fed back into the existing low pressure system.

At Gallowhill, gas from the outlet of the holder was boosted to the new semi-high pressure main by a Connersville booster driven by a three-cylinder vertical gas engine, the rated capacity of the booster being 200,000 cu.ft. per hour at 3½ lb. per sq. in. pressure.

Initially, it was only necessary to boost the gas during the mid-day peak, and at other times to maintain a pressure of up to 6-in. water gauge through a governor arranged to bypass the booster.

In 1939, it was decided to provide a stand-by to the gas engine driven booster, and at the same time to carry the semi-high pressure main back to the works to act as an alternative, in emergency, to the 30-in. diameter main linking the works with the holder station which, by the way, provides 70% of the available storage capacity.

A grant of 50% was given on the cost of providing and erecting at the works a 200,000 cu.ft. per hour at 5 lb. per sq. in. steam driven booster, but the whole cost of laying the linking main had to be met by the Undertaking as it was ruled that the risk of damage by enemy action to the existing 30-in. main was extremely remote. Be that as it may, the new booster was turned over for the first time on the afternoon of Aug. 13, 1940, and at about 11 p.m. on the same day the 30-in. main was fractured and ignited by two direct hits! That the new plant performed satisfactorily is borne out by the fact that no consumer suffered any interruption in supply.

The total gasholder capacity of the undertaking is only 5½ million cu.ft., and as it appeared that the number of sites suitable for the erection of gasholders was limited, it was decided in 1944 that two sites should be earmarked. One of these sites already belonged to the Corporation, and the other has since been acquired. Both sites are on the outskirts of the city, lying some three miles to the south and north-west of the works

respectively, and situated close to areas of potentially high demand.

In both cases the sites are below the average level of the city, and are well screened by rising ground and trees. In one case where it was known that there were considerable deposits of glacial debris in the vicinity, trial bores were made under the direction of the Building Research Station, and a satisfactory report received.

About this time, the 12-in. diameter pressure main was extended eastwards in the direction of the works for about three quarters of a mile, then to the south side of the River Dee, and from there through an area reserved for the construction of a satellite town to a new factory close to one of the proposed holder sites—a total distance of 2½ miles.

The extensive building development during the past two years has been largely close to or beyond the line of the original section of the pressure main, and has necessitated the provision of several additional governed feeds from this main. Boosting can no longer be restricted to the mid-day peak, but now extends over 11 hours with both boosters working in tandem during the middle of the day. Quite clearly it will be necessary before long to continue the main back to the works, thus completing the ring and permitting of boosting being carried out from both ends simultaneously.

Fortunately for the future development of the distribution system, it is intended that an outer ring road should be constructed and with this in mind the distribution mains in new housing areas beyond the present ring road have been planned to be fed eventually from a high pressure main which might be laid in the outer ring road to link the two proposed holder stations.

In the meantime, however, it has been necessary to concentrate on improving the existing distribution system, particularly to compensate for the growing demand on the north-west fringe of the area. Duplicate boosting fans, each with a capacity of 500,000 cu.ft. per hour, and giving an added pressure of 12-in. water gauge, have been installed at Gallowhill. By means of these boosters it is intended to operate the existing 20-in. diameter outlet main at about 15 in. w.g., reducing the pressure as necessary through mercury governors to be fitted to all existing branches. The 20-in. diameter main extends for a distance of 1¼ miles, and is then reduced to 14-in. diameter and eventually to 10-in. diameter. It is intended that a total length of 3¼ miles of this main should operate at raised pressure, and this will involve the fitting of 32 governors on branches varying in size from 3 in. to 10 in. diameter.

The first section of an 18-in. diameter main intended eventually to supply the proposed holder site in the north part of the town has been laid from the outlet of the fan boosting plant for a distance of 2,000 yards. At this point the first, and so far the only, tapping is taken off. By means of a 6-in. diameter governor a branch is connected into the low pressure network near to the centre of a fairly extensive area where peak load pressures have for some time been almost dangerously low. Despite the smallness of the connexion, the improvement in gas pressure which has resulted is very marked and extends over a much wider area than was anticipated.

The opportunity was taken when installing the boosting plant at Gallowhill to provide flow recorders on all out-going gas streams, and it is hoped by means of these instruments eventually to obtain some indication of the incidence of demand in the various quarters of the city.

Before leaving this very sketchy description of work carried out at Aberdeen and proceeding to more general topics, I should like to refer to a matter of which I have been very conscious during the progress of the work of reconstruction and extension.

Safety Measures

In recent years there has been a greater appreciation by employers and workers alike of their responsibilities in regard to safety measures, but despite this it is very necessary for engineers to insist at all times that full precautions are taken and special equipment used when appropriate, even when carrying out relatively simple operations of a routine character. Often this insistence may seem to be needless fusiness, but as we all know accidents can happen even in work which seems to be of the most commonplace kind. In this connexion the importance of adequate purging of plant and mains should not be overlooked, and two somewhat unusual experiences at Aberdeen may serve to illustrate this. The first of these happened some 20 years ago when gas was being admitted to a 24-in. diameter main newly laid from the works to a central point in the town. The air was being displaced by the following gas and was being exhausted through vent pipes along the route, when, for no apparent reason an explosion occurred in the main blowing up a section of the street about 450 yards distant from the works. The possibility of ignition having taken place from an external source was completely ruled out, and it can only be assumed that the explosion was caused by the heating of a fine deposit of iron oxide and peaty material adhering to the inside of the pipes which, by the way, were second-hand and had formerly been used for a short time for water supply.

The second case was when a spongy deposit on the bottom of a disused 18-in. main at one of the condensers became incandescent in a matter of minutes on being exposed to the air during dismantling operations. Purging with inert gas would have been the proper safeguard in the first instance referred to, while in the second case it is possible that a steam purge would have reduced the activity of the deposit to a sufficient degree.

Coal Supplies

Since 1939, perhaps no single problem has caused greater concern than that of coal supplies. Progressively the situation became more and more serious, accustomed sources of supply were cut off and, in many cases, particularly as affecting undertakings in the north and east, less satisfactory types of coal were provided in substitution; the ash content has more than doubled, and for longer and longer periods at a time reserve stocks have remained at a dangerously low level.

Athol W. Brown, Secretary of the North British Association; R. Sturrock (Ardrossan), Junior Vice-President; J. Campbell, Ministry of Fuel and Power.

It may be too much to hope that the worst has passed, but I think it is generally agreed that in Scotland the gas industry entered the past winter with much more satisfactory coal stocks than for a number of years—at least so far as quantity was concerned. By all accounts the production of coal has shown a gradual improvement, and it is frequently reported that the installation of new machinery and the adoption of improved methods will result in a further increase in production and, in due course, in a cleaner coal. When this stage has been reached, it is greatly to be hoped that the transport situation will have mended to an extent sufficient to allow of a return in some measure to former sources of supply. But whatever ray of hope may have been engendered by the prospect of improving coal supplies becomes more and more clouded by rapidly increasing costs.

Certainly the effect of the recent and monotonous advances in the cost of coal can be offset to some extent by the operation of the Gas Charges Orders of 1947, and by the increases permitted in the price of coke, but there is almost bound to be some time lag in applying revised gas charges, particularly in those cases where prepayment meters have to be altered.

Compared with the prices paid by the consumer for other fuels, charges for gas are now, in many cases, much too favourable. The price of coke, on the other hand, has risen more steeply than that of coal, and it would seem reasonable that there should be provision for a greater proportion of the increase in coal costs to gas undertakings being met by the gas consumers.

The adage "profits are made in the retort house," has been out of fashion for a number of years, but in view of the cost of our principal raw material and the value of the products derived from it to-day, never was there a time when close attention to the operation of the retort house was more vital. This may perhaps not result in the making of profits—also out of fashion —but it is assuredly the one way to meet our commitments. Gas-making is, however, only one of our many and varied pre-occupations, and it is indeed becoming more and more

difficult for a gas engineer to devote anything like an adequate amount of attention to the more fundamental aspects of his duties.

At a time when the demand for gas is growing rapidly and when most undertakings are suffering from a shortage of plant, the increasing difficulty involved in carrying out repairs or new work due to restrictions and shortages is encroaching seriously on the time and energy of gas engineers and their staffs.

We have become rather like a juggler keeping a number of plates in the air at a time. With three plates, say last year, this year, and next year there may be time to look about, but when eight plates, ranging from the year before last to five years hence have all to be kept moving amid a shower of multicoloured

Another group outside the hall. Left to right: E. Beevers (Peebles & Co., Ltd.); W. C. Campbell (Galashiels); D. J. Colvin (United Kingdom Gas Corporation); B. Fowler (The Bryan Donkin Co., Ltd.).

papers and streamers, a very much greater degree of concentration is called for.

The curtailment of expenditure on capital works by slowing down industrial and housing development may ease the position by reducing mainlaying work to some extent and may even have the effect of retarding slightly the rate of increase in gas consumption. Nevertheless if, as has been indicated, no additional steel is to be allocated to the gas industry for new work during the year 1948, it will be a severe handicap in the race against time, and may lead in a few years to the productive capacity of the industry being outstripped by demand. If that happens, then our holders will not protect us from "load shedding."

Clearly, with costly coal and curtailed construction, the next few years will be far from easy, but I have no doubt that the industry will rise to the occasion as it has done in the past, and that whatever anxiety there may be within the four walls of the gas works, the public outside will have no cause to worry.

Education

In the past year two steps have been taken which, I think, augur well for the future of our industry—namely, the decision by this Association to provide a Scholarship which will enable the fortunate recipient to obtain higher education in science or engineering, and the arrangement come to by the Institution of Gas Engineers and the Institution of Civil Engineers to adopt a joint examination. By this examination a candidate will not only obtain the qualification leading to membership of the Institution of Gas Engineers, but will at the same time qualify in Sections A and B of the Institution of Civil Engineers Membership Examination. The new examination arrangements should encourage not only the young men trained within our industry who are, and will remain, the backbone of its technical staff, but also those who may be attracted to it at a later stage in their career, bringing with them a fresh and broader outlook.

Have we not in the past perhaps been rather conservative in our choice of technical staff and inclined to insist on prior experience in the gas industry? After all, so many aspects of engineering are represented in the work of a gas engineer that it may well be to our advantage to give careful consideration to the merits of an applicant with good training and a varied experience in another branch of engineering even if he does require to be given some initial tuition and guidance in certain directions.

I am very conscious of a number of omissions from this address, but I cannot conclude without reference to the stimulating effect which the formation of the British Gas Council has had. The industry now has a voice which is making itself heard. From a more personal standpoint we have a special interest in the Gas Engineers' National Guild, which, although yet young, is growing apace.

The importance of the British Gas Council and of the Guild is underlined by the imminence of nationalization; on the efforts of these bodies will depend in no small measure the future of the gas industry and its personnel.

At the Park Lane Hotel, London, a new large-scale gas catering installation has been fitted in the kitchen by Benham & Sons, Ltd., to replace the coal and steam cooking apparatus installed by them in 1920. It consists of a Benham solid top range, Mark 3 pattern, specially finished in stainless steel. The range has 10 ovens with a steam-heated bain marie at both ends for sauces, &c., and a gas-operated salamander is fitted on one side of the range.

FUEL EFFICIENCY COMMITTEES RECONSTITUTED

Opening the Wolverhampton Industrial Centenary Exhibition on April 17, Mr. Hugh Gaitskell, Minister of Fuel and Power, announced that he had reconstituted the Fuel Efficiency Committee organization of the Ministry. This organization consists of a central Fuel Efficiency Committee, and a Fuel Efficiency Committee in each Region.

The Fuel Efficiency Committee was first set up in September, 1941, under the Chairmanship of Dr. E. S. Grumell, C.B.E., and has been active in furthering all aspects of the efficient use of fuel and power. As now reconstituted it will have the following terms of reference:—"To advise on the application of measures promoting economy and efficiency in the use and consumption of fuel and power; to survey the progress of the organizations established for this purpose; to report the problems arising from these surveys which appear to require scientific investigation; to advise generally as to the lines on which a policy designed to raise the standards of utilization of fuel and power can best be implemented."

Many members of the previous Committees have consented to serve on the new body and Dr. Grumell will continue to act as Chairman. Other experts in different branches of fuel technology and additional representatives of both domestic and industrial consumers have been invited to join. Liaison with both sides of industry will be ensured by the nomination of members of employers' and trade union organizations, and also with the Industrial and Domestic Coal Consumers' Councils, through their Chairmen. The Regional Efficiency Committees are being reconstituted on similar lines, and their Chairman will be "ex officio" members of the main Committee. The committees consist entirely of voluntary unpaid workers.

Among the members of the new Committee are Mr. **W. L. Boon,** O.B.E., Managing Director of Powell-Duffryn Technical Services, Ltd., formerly General Manager, London and Counties Coke Association. Dr. **E. V. Evans,** O.B.E., Managing Director, South Metropolitan Gas Company, formerly Chairman, Gas Research Board; Mr. **Oliver Lyle,** O.B.E., Director of Tate & Lyle, Ltd.; Dr. **A. Parker,** G.B.E., Director of Fuel Research Department of Scientific and Industrial Research; Sir **Ernest Smith,** C.B.E., Chairman of the Industrial Coal Consumers' Council, formerly Director-General of Gas Supply, Ministry of Fuel and Power.

THE REMOVAL OF HYDROGEN SULPHIDE FROM COAL GAS BY MEANS OF IRON OXIDE

Discussion on Mr. G. U. Hopton's Paper

IN our issues of April 14 (pp. 100-111) and April 21 (pp. 158-169) we published a paper on "The Removal of Hydrogen Sulphide from Coal Gas by Means of Iron Oxide," which G. U. Hopton, B.A., B.Sc., A.M.I.Chem.E., of the Gas Light and Coke Company, presented to a meeting of the Southern Association of Gas Engineers and Managers (Eastern District) on Mar. 30. Following is a report of the discussion.

Mr. **J. T. Haynes** (Bournemouth) congratulated Mr. Hopton on his excellent paper and said he had rarely read through a paper with so much interest. The author had to some extent recapitulated what he and Mr. R. H. Griffith had given to the Institution of Gas Engineers at the Autumn Research Meeting in 1945, with a report of the continuation of their work up to the present stage. If he ventured to be critical he did not want to be taken as casting any reflection on the excellence of their work or the satisfaction which they all felt that what they had found in their own work without such scientific knowledge was confirmed as being correct. It was so easy to depart from the straight and narrow path laid down for their pursuit in the chemical text books that he was surprised many of them managed to do as well as they did. The author had dealt with the valuation of oxides, and he wondered whether he had ever come across a most satisfactory purification medium with which he had had experience a few years ago when he was in Yorkshire. He obtained some ordinary blast furnace dust and mixed it with peat moss and used it in the purifiers. The experiment came to an early end because he left the industry temporarily and because the price of peat moss became prohibitive, but at the time it was most satisfactory.

The author had touched only lightly on the bugbear of caking. They knew something of what the Gas Research Board had been doing in the past year. He felt somewhat concerned as to how far there might be overlapping or duplication of effort in that matter; whether the Gas Light and Coke Company, with its remarkable research organization, was developing this work in conjunction with the Gas Research Board, or whether the Gas Research Board were in fact leaving the work to the Gas Purification Panel, of which Mr. Hopton was the Chairman.

Nationalization and Research

One problem that concerned many of them at the present time was the position of research in regard to nationalization. Were they going to have their research directed by the new central Gas Council, or was each Area Board going to carry on research with some sort of co-ordinated control by the Gas Council? Although it might not be a matter for the present meeting, it was certainly one that was occupying many minds at the present time. Mr. Hopton had made all his investigations under conditions which he supposed represented nominal capacities, but it had to be borne in mind that most of their purifiers were working at their nominal capacity for something like two months in the year. For the rest of the year they worked at something less than nominal capacity, and even for two or three months they might be completely idle. They probably had no information at all as to what was happening inside the purifiers during the periods of low rate, and no rate at all. It might be that the instructions laid down in the paper were completely nullified by the actual conditions that existed throughout the whole 12 months at their works. For example, Mr. Hopton laid it down very positively that the oxide should not be acid, and he also said quite positively that the temperature of the oxide should be between 40° and 50° C. Yet, as Mr. Hopton knew, he had been able to introduce Dr. Dent, of the Gas Purification Panel, to a certain coke oven plant which for years had been free from caking, where the purifiers were worked at about 150° F., and they also allowed their oxide to become acid; and yet they never had any caking. He wondered how far the availability of nodules, and their cost, was going to make their use prohibitive in ordinary gas-works. While it might be easy to control purification on a small scale plant it was not so simple on full scale plant, and he would like to feel that there was some possibility of obtaining the nodules or something equivalent for ordinary gas-works processes.

One other problem of considerable importance to the gas industry was the question of cost. By careful manipulation of their plant they might be able to reduce the cost of purification by a minute fraction of a penny per therm, but they might well be throwing a great deal more than that away if they were unable to dispose of their spent oxide. Some work therefore should be done on the problem of sulphur extraction, with a view to securing an appreciable contribution to their balance sheet.

South Metropolitan Practice

Mr. **L. Muir Wilson** (South Metropolitan Gas Company) said Mr. Hopton had made it clear that hydrogen sulphide purification should be conducted as a chemical process, and he could support the rightness of his view from the experience of his own Company. If a chemical outlook was combined with up-to-date mechanical handling really revolutionary results were possible. For that reason he congratulated the Chairman (Mr. H. J. Escreet) on having obtained two such excellent papers to be given about the same time, as the present communication and that given a month earlier by Mr. J. D. C. Woodall on "Material Handling in a Provincial Gas-Works"; it was a matter for great personal regret that he had been unable to attend the meeting at which Mr. Woodall presented his paper.

He believed that oxide boxes should not be used to filter tar out of gas. For that reason his Company was now installing electrostatic tar precipitators instead of Livesey washers on all new plant. On all their works they rotated their boxes backwards, so bringing the last box into first position, and they admitted air in the second position only, while they went to great lengths to see that no adventitious oxygen got mixed with the foul gas on its way to the purifiers. Thus, when reducing conditions were maintained in the first box, they found that HCN was more completely removed from the gas, and it was in the form of Prussian Blue, and also the gum forming constituents were completely removed. At one of their works they seemed to be on the verge of serious gum trouble until they completely eliminated free oxygen from foul gas. Their finished gas contained only 0.20% oxygen. They admitted 1.5% of air in the second position and this was metered into each stream under the supervision of an attendant in the calorific control centre, who was also aware of the rate of coal gas flow through each stream. This procedure gave him control of a factor which affected calorific value, while it ensured proper supervision of the purification process.

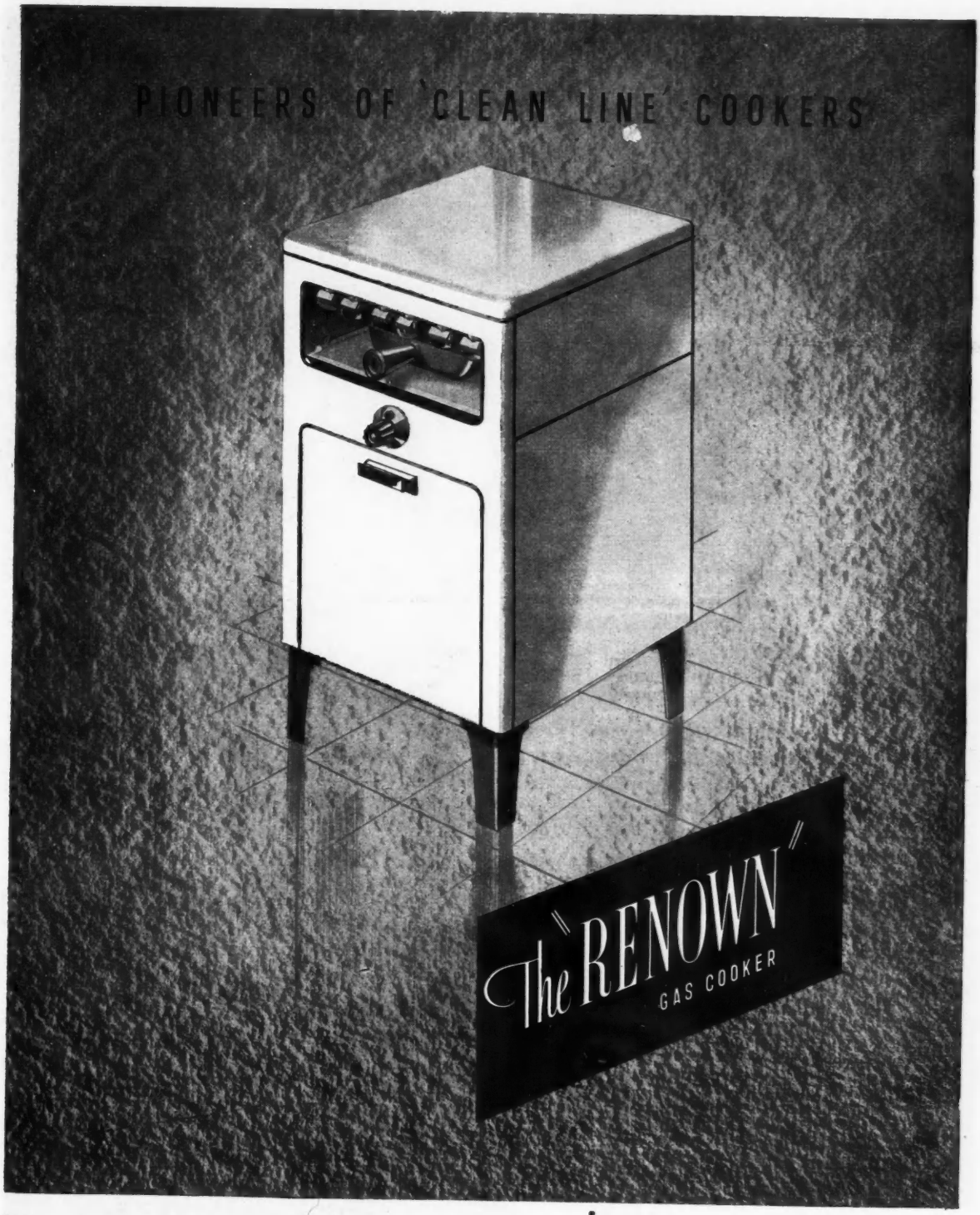
Drying Bog Ore

The area of their boxes per 1,000 cu.ft. of gas purified per hour was approximately 8 sq.ft., which was considerably less than that employed elsewhere, yet they always maintained their standard gas purity and usually worked up to over 50% sulphur on the dry basis in two foulings, and a blue content of 6%. On the subject of drying bog ore they had discovered that when it was dried artificially at temperatures of 100° C. it became too inactive for their process, and that bog ore contained bacteria which could generate small traces of H_2S. For the last reason new bog ore should never be placed in a catch box. It was better to make up the charges with semi-spent material or to render them asceptic with small traces of a copper salt. Attention should also be given to wet lutes or they might breed H_2S generating bacteria such as were encountered in gasholders and in station meters. All of these were best treated with zinc oxide suspension. Hard boxes were practically unknown in their experience. They were probably caused by being left in too long, and this was not possible with boxes as heavily loaded as theirs. It seemed that in time large sulphur crystals grew which bonded the charge into a very hard mass.

Mr. **Horace Chamberlain** (Associate Member) heartily endorsed the author's remarks about closer co-operation between the chemist and the engineer. Small scale tests did not always give reliable results. On the question of ground floor or two or three tier construction of purifiers, for example, the vital consideration was not so much capital cost as the question of labour. It was increasingly difficult to get men to do the arduous work associated with purifiers. He suggested that more work should be done on the question of reducing the capacity of purifiers. Frequency of change of rotation was another important factor; in his view it was desirable to make the change at least once a day, preferably twice; he would even go so far as to suggest that it should be every shift. He thought it would be of interest to know what the author would suggest in regard to the removal of naphthalene from flue gases before purification.

No Lack of Co-Ordination

Dr. **H. Hollings** (Chairman of the Gas Research Board) said he wished to say a word about the relationship of the Gas Research Board programme with the work that had been described by Mr. Hopton. He thought it would be very unfortunate if there went out from that meeting any impression that there was any lack of co-ordination of their research efforts. Mr. Hopton had been describing the work of the Gas Light and Coke Company with which he had been associated for a period of several years. More recently the Gas Research Board had extended its programme of work to include the study of some of the problems relating to oxide purification and extraction of sulphur from the oxide. From what they had heard that afternoon he thought it would be agreed



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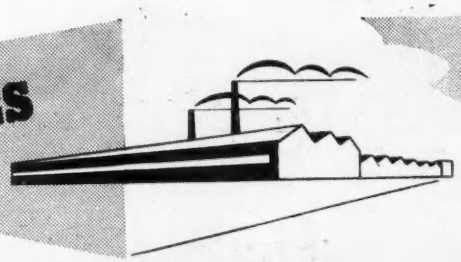

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that the Gas Research Board had been very fortunate and had also shown some wisdom in electing Mr. Hopton as Chairman of the Panel which was to assist in advising the staff of the Board in the conduct of their work. The particular feature of the work at this stage covered the question of the reduction of the amount of labour involved, particularly in emptying the purifiers, and also another problem which had been referred to in the paper—that of the extraction of sulphur from the spent oxide.

When the research department of one undertaking was conducting investigations of this kind, limitations immediately arose because of the difficulty of getting quantitative data which Mr. Hopton had shown to be so important, covering all the variables. There were a number of subjects which he thought were better investigated on a wider scale—a national scale if they liked—and having got so far he had no doubt in his own mind that this was one such field of research, in which the help of undertakings might be enlisted. He was sure that Mr. Hopton's Panel would see the possibility of studying in that way a wider range of variables, such as the space velocity, the time for which boxes were off for repair, frequency of rotation, and many other questions. He was hopeful that the recently appointed Purification Panel or its staff would prepare an interim report, and although he could not make any promise he was hopeful that at the November Research Meeting of the Institution of Gas Engineers they might have a wider discussion on this subject. He thought Mr. Hopton had given them a very pleasing foretaste of what they might look for later.

Air Admission

Mr. **W. A. Evetts** (Watford and St. Albans Gas Company) said that at the three works with which he was connected they had altered the position of the air admission from the first box to the second. At the first works they were convinced that the oxide was not so hard in changing. The engineers at the three works did, in fact, in the winter time add some air in the first box because they found that the oxide was not so active without air. He noticed that in one of the tables reference was made to an interval of nine days between the rotation of the boxes, and he would welcome an expression of opinion from the author as to the best arrangement for rotation. He had looked forward for years to a book which Dr. Hollings had promised to write on purification —and they were still waiting.

Dr. **J. G. King,** Director of the Gas Research Board, offered congratulations to Mr. Hopton on an excellent paper; he had accomplished a great task in compressing so much information into so small a space. Dr. Hollings had indicated that the Gas Research Board was dealing with this problem, and it might be possible to say something in the autumn of this year. The first point which had impressed the staff of the Gas Research Board was the large number of variables which obtained in this problem, but they had had a unique opportunity of learning at first hand from Mr. Hopton all the variations with which he had made contact during a number of years in which he had been employed on gas purification problems. They had thus got away to a flying start notwithstanding that they had been impressed by the impossibility of reconciling the many variables which occurred and the extreme difficulty of presenting a reasoned account of the varying factors. Dr. Hollings had also referred to the fact that the Gas Research Board found itself in a very favourable position in regard to the investigation of processes of this kind where there were so many variables. It was possible for the Board to approach engineers and chemists in a large number of undertakings and to persuade them to devote boxes to this work. That had been done in a fair number of cases; obviously it would be unwise to do it in too many cases, and he would like to take the present opportunity of expressing his gratification and that of Mr. Hopton, as Chairman of the Panel, for the help they had received throughout the gas industry.

Mr. **A. H. Savill** (Wandsworth and District Gas Company) said Mr. Hopton had mentioned that in his case it was most desirable that the temperature of the oxide should be kept reasonably low so as to prevent the formation of ferric oxide. He wondered whether it was desirable to do that in all cases. Some companies turned the oxide over several times before putting it into the boxes, and he wondered whether the object indicated by Mr. Hopton was not adequately met by discharging the oxide from the purifiers, passing it to some kind of crusher, and returning it again to the purifying stream.

Dr. **S. Pexton** (Gas Light and Coke Company) said there was only one point to which he wished to refer, and that was with respect to the possible retardation of the absorption of hydrogen sulphide, not only by tar fog in the oxide under conditions such as Mr. Hopton had described, but also, for example, by light oils associated with the gas from, say, continuous vertical retorts. He asked whether condensation of such material was not definitely a factor in retarding the absorption of hydrogen sulphide by the oxide.

The Author's Reply

Mr. **Hopton,** replying to the discussion, said he did not pretend to have said the last word on the subject. He had been very interested to hear Mr. Haynes's reference to the use of blast furnace dust and peat moss. He had not personally had any experience of its use, but he was aware, due to the work which he was doing for the Gas Research Board, of the fact that the properties of oxides varied very widely. Thanks to the kind co-operation of a very appreciable number of companies in the country they had studied a very wide range of oxides. They could not always accept the results of a laboratory investigation as final, and they could do things on the works which laboratory investigations suggested to be desirable. They did not claim to have studied all the reactions, but there were very good reasons for maintaining neutral or even slightly alkaline conditions in the purifiers. He had been surprised to hear from one of the speakers of oxide being used at a temperature of 150°, the chief point being that there was no caking. They were looking into that matter as much as they could, but he would have liked to have a sample of the oxide, for that was really the criterion.

With regard to the use of nodules for full rate purification, they had not thought of using them at the moment, for obvious reasons. It took time to develop a new process, and they were not in a position to prepare 12,000 tons of oxide a year for their Company. They had to build these things up slowly, and they had made a start on a catalytic plant with a view to working their way up. There were people outside this country who were very interested in the subject and they thought in somewhat bigger terms. With regard to Mr. Muir Wilson's system of air admission to the second box, he had had the privilege of inspecting the system as a member of the Panel of the Gas Research Board, and he admired the South Metropolitan purification arrangements very much indeed. Another speaker had referred to the question of second box air admission and had borne out what Mr. Muir Wilson had said with regard to freedom from caking.

The labour problem in connexion with purification was important, and he agreed that at the previous meeting of the Eastern District Mr. Woodall had given the members some very useful pointers in that direction, which they should all study very carefully. With regard to the frequency of rotation, practice varied considerably between one works and another. The highest frequency seemed to be about once in every 24 hours and at other works the periods varied from two to three days, with some places reaching five days. It was not a very good thing to leave them for too long a time, and there were occasions when trouble arose in that way. Personally he favoured 24 hours, and he had been encouraged to find how many works operated on that frequency of rotation.

It was very much to be desired that both light oils and naphthalene should be removed before the gas reached the purifiers, and he did not think there was any difficulty in removing them. It was possible to remove the naphthalene by oil washing and, in fact, naphthalene was removed by oil washing in benzole plants. In his view four boxes was the minimum for any purifying system, and he did not see any chance of reducing the number. There were advantages to be gained from research on caking and sulphur extraction.

On the motion of Mr. **G. R. Bullwinkle** (South Metropolitan Gas Company), seconded by Mr. **Frank Dawson** (North Middlesex Gas Company) a vote of thanks was accorded to the author, to which Mr. **Hopton** briefly replied.

Gas Bill—(concluded from p. 203)

they thought that year was the most relevant in relation to Stock Exchange values for 1945, because by that time dividends might have been influenced. "I am inclined to doubt whether the V weapon damage in 1945 came sufficiently early to influence the matter, but I am anxious to be absolutely fair . . . . I am prepared to look into the matter again . . . . I think we might possibly take the average of 1943 and 1944."

Colonel Crosthwaite-Eyre: "I ask for 1945 to be included."

Mr. Gaitskell: "The trouble about making concessions is that it always leads to demands for more . . . . While I do not see my way to making any concession of debentures, with preference shares there might be a case."

Mr. Bracken: "Never since Moses struck the rock and found water has there been anything more remarkable than the sudden desire of the Government to show some sympathy for ordinary stockholders."

Mr. Glenvil Hall: "As far as I know, Moses did not strike the rock in order to help the ordinary stockholders."

Lieut.-Colonel Elliot: "He struck the rock in order to improve the prospects of the ordinary stockholders in the enterprise of the exit from Egypt."

Amendment, by leave, withdrawn.

On Clause 26 (appointment of stockholders' representative), Mr. Robens said the Minister would bear in mind, when making regulations under the Clause, the point of an Opposition amendment, later withdrawn, requiring provision to be made where a stockholders' representative died or was removed from office.

Mr. Robens compromised on three months instead of the Bill's two months and an opposition call for four months as the requisite interval permitted for appointment of stockholders' representative, and this was written into the Bill.

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Extracts from the review appearing in "GAS JOURNAL," April 21, 1948

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THE COKE POSITION AND NATIONALIZATION

A "CRUMBLING STRUCTURE" IN THE MIDLANDS

THE Tenth Annual General Meeting of the Midland Counties Coke Association was held at the Chamber of Commerce, New Street, Birmingham, on April 8. The Chairman, Mr. F. C. **Briggs**, Dudley, Brierley Hill, and District Gas Company, presided at a very well-attended meeting.

During the course of his annual review, Mr. Briggs referred to the general increases in coke prices during 1947 which, with the further 3s. 4d. per ton on Jan. 1, 1948, brought the total general increase in gas coke prices since September, 1939, to 38s. 1d. per ton in the M.C.C.A. Area. He described how these general increases in coke prices were negotiated, and said the Executive Committee had been giving serious consideration to the present level of coke prices, and had asked for members' opinions on this subject.

On the important question of merchants' margins, which had been under review for so many years, the Chairman said that discussions had been re-opened during the year. The Producers' and the Distributors' Committees had appointed a Joint Sub-Committee which met and tabled certain proposals. The Producers' Executive Committee had spent two or three whole meetings discussing details and making certain amendments. However, it had finally emerged that there was still a wide divergence of view, a minority of the Committee (but a minority which controlled the greater majority of coke) remaining unconvinced of the necessity for revision of merchants' margins. This minority were not prepared to implement the scheme, even if it were agreed upon by a majority, so that in any case it would have had to be permissive. The Distributors' Branch were informed and felt that the scheme could not be expected to work unless it were implemented by all producers.

The Chairman said this raised a very important constitutional issue—whether voting in such cases should be by undertakings or on a tonnage basis. It was an issue which would have had to be settled if the Association were continuing, but was less important in view of impending nationalization.

Continuing on the subject of prices, the Chairman mentioned the setting up by the Solid Smokeless Fuels Federation of a Joint Price Structure Committee, in collaboration with the National Coal Board, to work towards the establishment of a properly co-ordinated price policy and standard conditions of sale for solid fuels. "To some of us," he said, "it has been obvious for years, and we have never ceased to press this home, that sooner or later reconstruction of price schedules was inevitable. What I had hoped was that this reconstruction of coke schedules should come from *us*, and that we should not wait until it was forced upon us by some outside agency. You have heard this from me time after time; but as I have explained to you, the initiative is not now to be with us."

The task that the Price Structure Committee had set itself was to consider the relative value of various solid smokeless fuels and to explore the development of a national price structure for these fuels on the basis of zoned prices to be observed by all producers and distributors. A Technical Panel had been set up to make a technical evaluation of certain fuels; and a Price Panel was preparing a factual survey of the existing price structure of solid smokeless fuels in every District. Each District Coke Association had set up its own Price Structure Committee with representatives of hard coke and anthracite. The Midland Committee had completed, some few weeks ago, the formidable task of preparing a factual survey of the actual retail selling prices operating throughout a cross-section of the Midland Counties Coke Association Area, together with margins, on the lines laid down by the National Committee.

A Different Situation

Mr. Briggs said that the subject of coke supplies during 1947 had been covered in the annual report, and the situation was now very different. We were meeting, he said, at a time when gas coke supplies were over-plentiful and stocks at gas-works, instead of being eaten into as they usually were in the first three months of the year, were actually mounting. At the last annual meeting in March, 1947, we had met at a time of severe shortage and with the anticipation of still greater shortage in the twelve months to come. We had not known then that the cessation of water gas production and an exceptionally mild winter would reverse the position. The opinion was held by many that the price of fuel was partly responsible for the present surplus, as less money was being spent by the public.

"This time last year," he said, "it was obvious that we had to do something to spread available coke supplies as evenly as possible over the area, and moreover that the cost of moving coke into shortage areas should be shared out on a fairer basis. I suggested that some kind of coke pooling scheme was inevitable. As is known, we brought our Coke Pooling Scheme into operation on Oct. 13, 1947, and this has been dealt with at some length in the annual report. All members are familiar with the machinery of the scheme, which has been explained in circular letters from the Secretary, and members have received this week the official Memorandum agreed with the Ministry. There is no doubt that the scheme is serving an extremely useful purpose, and is invaluable at the present time."

The original object was to make sure that consumers in shortage areas could have coke transferred to them from places where it was more plentiful, and that these consumers in the shortage areas should only have to pay the local price, instead of being penalized because of a long rail haul.

Surplus Coke

The scheme was now being used to relieve over-stocked gas undertakings of their surplus coke. From Oct. 13, 1947, to Feb. 28, 1948, approximately 28,583 tons of coke were moved through the scheme. It seemed unlikely that the levy of 6d. per ton on consumers would cover the costs for long, but there was unanimous agreement that the consumer should not be asked to pay a higher levy, and that if it were found necessary to augment the coke pooling fund this should be done by reducing the price paid to the selling producer, and if this were not sufficient, by raising a small levy from all producers on all coke produced by them. The Committee considered that the fairest way was a combination of these two methods.

The Chairman said that except for some shipments of coke breeze to Ireland, exports of gas coke and breeze from this country had ceased in September, 1939; but a month or two ago authority had been given for the export of a specified tonnage to hard currency countries. The Gas Coke Export Association had asked the District Coke Associations to deal with these shipments, in conjunction with the District Coke representatives, the latter being responsible for the allocation of the District quota between individual undertakings.

The Executive Committee had decided that export should be dealt with through the Coke Pooling Scheme, as we had reached a point where we believed in sharing our burdens and our profits. The present f.o.b. price was 110s. per ton for gas coke and 30s. per ton for gas coke breeze. If coke were exported through the Pooling Scheme it would mean that any undertaking which received a permit from the District Coke Representative to export a certain quantity of coke would receive the same works price as for an ordinary pooling transaction and would have no railway rates or exporters' commission to pay. The whole business would be dealt with by the Working Committee, the order for the coke would be found, shipping arrangements made, and railway rate and exporters' commission paid out of the Pooling Fund. Any surplus money would go into the Pooling Fund, and while the export price remained so satisfactory this might benefit the Pool to such an extent that the methods he had already mentioned for augmenting it might not be necessary. Should the export price fall, then undertakings were still sure of a reasonable price at gas-works. This seemed to the Committee the fairest way all round of dealing with export, and the proposals had been put to the Ministry of Fuel and Power and to the Gas Coke Export Association. The time had come when it was realized that the National Federation of Gas Coke Associations and the Gas Coke Export Association should work together more closely, and those two bodies were considering whether membership of the Export Association could be composed of the District Coke Associations instead of individual undertakings.

A Matter for Regret

"Of the Coke Distributors' Branch," he said "there is little to say which is not bound up with merchants' margins. You may remember our early difficulties, before the war, in getting the collaboration of distributors. For the first year of our existence they were inclined to sit on the fence. With hard work and enthusiasm we built up a sound organization, made a firm alliance with the hard coke industry, and produced with them a joint schedule of prices for gas coke and hard coke. The distributors then admitted that we had succeeded where they had thought it impossible, and agreed to the formation of a Coke Distributors' Branch which meant in effect that no merchant who was not a member of that Branch could deal in associated gas coke or hard coke, and that they were all bound to respect our minimum prices and our regulations for the sale of coke. Price cutting, a word which is beginning to creep back into our vocabulary, was ended for coke, and all that was left to do was to revise our prices in the light of distributors' experiences, which we were to do immediately after the summer holidays of 1939. For some time we enjoyed the active collaboration of the distributors, and real constructive work was done jointly with them and with the hard coke producers.

"To those of our members who have joined us only in the last few years this summing up of the early work of the Association is just a sentence or two. The 'getting-over' to Midland gas undertakings that price cutting between themselves was not in their interests, and that mutual protection and concerted action would pay a dividend; the gradual increase in membership from a mere handful to 98% of the coke produced; the hammering out of a price schedule from a blank sheet of paper, thanks largely to our Price Advisers; the fixing one by one of literally thousands of prices; the achievement in getting the co-operation of hard coke producers—a co-operation which was wholehearted when it came; the thrashing out of the Distributors' Branch Constitution to provide a three-party forum on coke matters; the enlistment of over 2,000 merchants in the Coke Distributors' Branch. All this was a hardly-won achievement, and those of us who were in it from the beginning find it hard to watch the crumbling of the structure. There is no doubt in my mind that we have not retained the goodwill of the merchants and we have not met their reiterated request for better margins.

"I am often asked what will be the end of this Association. I presume there will be Regional Gas Boards who will sell coke and we shall all be under one umbrella. I think, therefore, that this Association as such will cease to exist, but those who take on the responsibility of selling coke for the Regional Boards would be very unwise not to take advantage of the enormous amount of experience and knowledge we have in our Coke Association office. I think we can pride ourselves on having done something which was worth while, and it is my very great regret that before we hand over we shall not have finished our job. We have to remind ourselves that nationalization will not be the opening of a glad new world, but will be the carrying on of existing gas undertakings by those of us who have been in it all our lives, and instead of having the freedom to carry out our own views we may have to carry out the instructions of those imported into the industry for the first time. The work will be ours and the difficulties will be ours. I have always felt that if we could have carried into the new world the goodwill of the distributors so much the easier would our task have been."

Mr. **Briggs** then moved the adoption of the report and accounts.

Mr. **C. M. D. Belton** (Shrewsbury Gaslight Company) seconded the adoption of the report and accounts.

Mr. **E. A. Goodland** (Birmingham Gas Department), Joint District Coke Representative, reported on coke programming.

Mr. **T. F. E. Rhead** (Birmingham Gas Department) felt members should not leave the meeting with a feeling of depression due to the advent of nationalization. As a technician he felt they should be optimistic. It was up to technicians to make better coke and design better appliances. He reminded members that after the great war some inferior coke had been sent abroad, and he hoped that now export had been resumed members would see that the export market was not spoilt by a recurrence of this bad policy.

The report and accounts were then unanimously adopted.

The **Chairman** proposed a hearty vote of thanks to Miss Price (Secretary) and Mr. Maddocks (Programming Department) and the rest of the staff, and to Mr. W. L. Wright, who had recently become Secretary to the Distributors' Branch. This was seconded by Mr. **A. Lee** and carried with acclamation.

Miss **Price**, Mr. **Maddocks**, and Mr. **Wright** replied.

GAS UNDERTAKINGS' RESULTS

Shirebrook and District Gas Company.—Balance of profit carried from revenue to profit and loss account for the year ended Dec. 31 was £7,356, the net profit after providing for taxation being £3,762. A dividend of 12½% leaves a balance of £8,723 to be carried forward, against £8,398 brought in from 1946. The Directors' report points out that as the Company's shares are not quoted on the London Stock Exchange, the compensation payable under the Gas Bill will be the subject of agreement between the Ministry of Fuel and Power and a representative of the shareholders.

Australian Gas Light Company.—The Directors report that the net profits for 1947, including the balance of £138,104 brought forward, amounted to £428,006. An interim dividend of 3% was paid in August and a final dividend of the same amount was declared at the annual meeting, leaving a balance of £136,406 to be carried forward. Mr. F. B. Spencer has resigned from the Chairmanship and from the Board following his appointment to the world board of an international organization, which requires him to spend a prolonged period overseas each year, and Sir Samuel S. Cohen has retired from the Board owing to ill-health. Mr. O. G. Vickery has become Chairman, and the vacancies on the Board have been filled by the appointment of Mr. A. T. Anderson and Mr. G. G. G. Russell.

Associated Gas and Water Undertakings, Ltd.—The Directors will recommend at the forthcoming annual general meeting a final dividend of 2¼% actual, less tax, on the Ordinary stock, making with the interim dividend already paid 5% actual, less tax, for the year ended Mar. 31, 1948 (same); and a final dividend on the Deferred stock of 2½% actual, less tax, making 6% actual, less tax, for the year (same). The net profit for the year, subject to audit, amounts to £77,991, compared with £72,777 for the previous year. Annual meeting, May 26. The total distribution on the Ordinary stock and the Deferred stock are the same as for the previous year, but interim dividends of 2¾% and 3½% were paid on the Ordinary and Deferred stock respectively. The Directors announce that it would have been possible to have paid the same rate of final as interim dividends, but they are prevented from doing so by the provisions of the Gas Bill.

South-Western Gas and Water Corporation.—The Board recommend the payment of a final dividend of 3½% (actual), less tax, for the year ended Dec. 31, making a total dividend of 5½% for the year. Net revenue was £21,070 against £18,844 for 1947.

PUBLICATIONS RECEIVED

Aims of Industry—a non-party, non-profit making organization created to centralize the fight against State control—has published, under the title of "Towards Disaster—Public Ownership the Wrong Step," a 16-page 2d. pamphlet by way of answer to the Labour Party's "Public Ownership the *Next* Step." It asks whether, if gas industry workers lose their co-partnership benefits when the nation takes over, they will feel more reason for enthusiastic co-operation, and sets out a series of questions for discussion groups. For instance, is nationalization effective? (What do we mean by effective; do we mean effective in bringing industry to a standstill?) Should Britain be given an even chance of survival by leaving some part of individual industries free to provide goods and services while the nationalized sections squander taxpayers' money?

COMPANY NEWS

Drakes, Ltd.—The 46th annual report and accounts covering the year to Dec. 31 show a trading profit of £49,798 compared with £38,454 for the previous year. From a total available balance of £45,233 a sum of £10,000 is transferred to revenue reserve, and provision is made for preference dividend at standard rate and an Ordinary dividend of 10%, less tax, with a centenary bonus of 10%, less tax, leaving £25,833 to be carried forward against £20,418 brought in from 1946. The report records that Mr. James Schofield, Secretary of the Company, retired during the year after over 50 years' service. Mr. W. Cyril Shoesmith has been appointed in his stead.

Parkinson & Cowan, Ltd.—The Directors announce that they are recommending at the forthcoming annual meeting a dividend of 5% actual, less tax, on the Ordinary stock in respect of the year ended Dec. 31, the same as for 1946. They also announce that the consolidated gross profit of the Group for 1947 amounts to £243,254, compared with £180,533 for the previous year. The consolidated net profit for the Group for 1947, after providing for debenture service, depreciation, taxation, &c., amounts to £83,824, compared with £58,041. The Directors point out that the increased profits would have permitted a larger dividend on the Ordinary stock, the earnings being equal to 15%, but the rate is being maintained in conformity with the request of the Government.

GAS STOCKS AND SHARES

The results of the Italian elections and the news of Britain's share of American aid under the European Recovery Programme had a favourable effect on stock market conditions last week, although the number of bargains recorded on the London Stock Exchange was lower than in the previous week. British Government securities ended the week on a slightly higher level, and price changes in industrial shares, although small, were nearly all in favour of holders.

While the compensation clause of the Gas Bill was under discussion in the Standing Committee of the House of Commons, dealings in gas stocks were again more numerous than they have been for some time, and all price changes showed increases except in the case of Alliance and Dublin, which were 3d. down at 22s. 3d., Colonial Gas Association (a decrease of 6d. to 17s.), and Imperial Continental, which dropped one point to 126½. A notable increase was that of Montevideo Gas and Dry Dock, which finished the week nine points higher at 133½.

The week's rises and falls were as follows:

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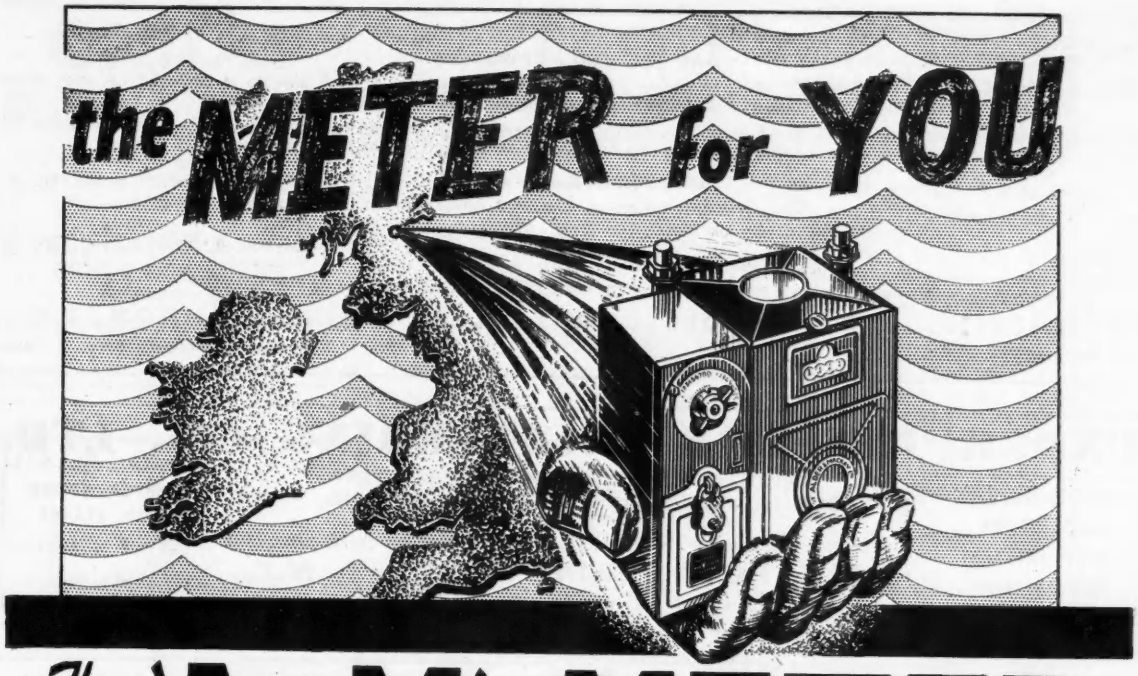
Bristol, gen. cap. 5 p.c. max.	112 —117	+	1
British Gas Light, ord.	127 —132	+	3
Cardiff, cons. ord.	119 —124	+	1
Colonial Gas Association, ord.	16/ — 18/	—	6d.
Commercial, 3 p.c. deb. perp.	72 — 77	+	2
Eastbourne, "B"	94 — 99	+	1
Imperial Continental, cap.	124 —129	—	1
Montevideo, ord.	131 —136	+	9
South Eastern Gas Corp., ord.	22/ — 23/	+	3d.
Swindon, cons. ord.	114 —119	+	1
Tottenham, 5½ p.c. irred. pref.	119 —124	+	1
Do. 4 p.c. perp. deb.	95 —100	+	1
United Kingdom, 4½ p.c. 2nd non-cum. pref.	19/3 — 20/3	+	3d.
Uxbridge, &c., 5 p.c. cap.	119 —124	+	1
Do. 5 p.c. perp. deb.	117 —122	+	1
Watford & St. Albans, 5 p.c. pref.	105 —110	+	3
Do. 5½ p.c. pref.	120 —125	+	3
Weymouth, ord. 5 p.c. basic	92 — 97	+	2
Woking District "A" ord.	182 —192	+	2
Do. "B" ord.	128 —133	+	3
Wolverhampton, cons. ord.	119 —124	+	1
York, cons. ord.	97 —102	+	2



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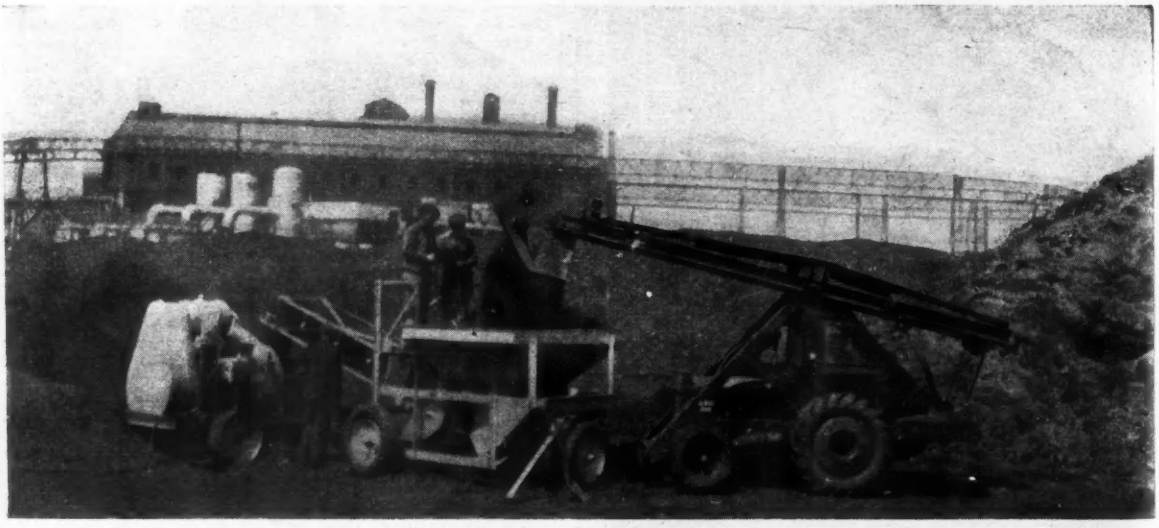

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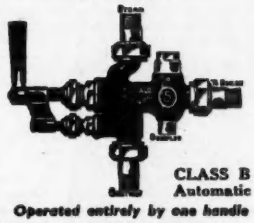

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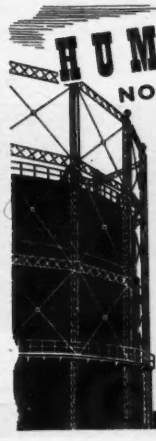

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W. WILLIAMS,
Gas Engineer and Manager.

Gas-works,
Alexandra Road,
Tipton, Staffs.
April 23, 1948.

(*Classified advertisements continued on Supplement 4*)

CONTRACTS OPEN (ctd.)

THE SITTINGBOURNE AND MILTON URBAN DISTRICT COUNCIL

(GAS DEPARTMENT.)

INVITE tenders for the supply and erection of one CAST IRON PURIFIER.

Particulars may be obtained on application to the ENGINEER AND MANAGER, Gas Offices, 67, High Street, Milton, Sittingbourne, Kent.

LANCASTER/MORECAMBE JOINT GAS COMMITTEES

TO MAIN LAYING CONTRACTORS.

TENDERS are invited from Contractors with experience in gas main laying for EXCAVATING, LAYING, JOINTING, TESTING, FILLING IN, DISPOSAL OF SURPLUS AND TEMPORARY REINSTATEMENT WORK in connexion with the laying of approximately 2.9 miles of 18 in. bore Stanton-Wilson spun iron main to convey gas from a new gas-works site at White Lund to the Lancaster and Morecambe gasholders.

The 18 in. mains and specials will be supplied by the Joint Gas Committees.

Specification and tender forms can be obtained from the Joint Gas Engineers, Central Office, Gas-works, Lancaster.

R. M. MIDDLETON,
Town Hall, Town Hall.
Lancaster.
April 21, 1948.

CITY OF MANCHESTER

(GAS DEPARTMENT.)

THE Gas Committee invites tenders for the WORK AND MATERIALS required in the Renewal and Repair of the Balcony Plates on the Waterless Gasholder, Bradford Road Gas-works.

Specification, general conditions, and form of tender may be obtained on application to the Commercial Manager and Secretary, Gas Department, Town Hall, Manchester, 2.

Sealed tenders in the envelope provided addressed to the Chairman of the Gas Committee and endorsed "Repairs—Waterless Gasholder," must be delivered at the Gas Office, Town Hall, Manchester, 2, not later than 5 p.m., Friday, May 7, 1948.

The Committee does not bind itself to accept the lowest or any tender.

PHILIP B. DINGLE,
Town Hall, Town Clerk.
Manchester, 2.
April, 1948.

Amended advertisement extending time limit for delivery of tenders.

BOROUGH OF REDCAR

(GAS DEPARTMENT.)

CARBURETTED WATER GAS PLANT.

TENDERS are invited for the supply, delivery and erection at the Corporation Gas-works, West Dyke Road, Redcar, of:

1,000,000 cu.ft. per day mechanically operated CARBURETTED WATER GAS PLANT, complete with jacket boiler for the generator, gas condenser, and water cooling and circulating plant, coke handling equipment, together with a steel framed building to house the plant.

Further particulars, specifications, general conditions of contract and form of tender may be obtained from H. P. Allison, M.Inst.Gas E., Engineer and Manager, Gas-works, West Dyke Road, Redcar.

The Borough Council does not bind itself to accept the lowest or any tender.

Tenders, in plain sealed envelopes, endorsed "C.W.G. Plant," should be delivered to the undersigned at the Municipal Buildings, Redcar, by first post on Friday, May 21, 1948.

H. CALDWELL,
Municipal Buildings, Town Clerk.
Redcar.
April 22, 1948.

APPOINTMENTS VACANT

None of the vacancies in these columns relates to a man between the ages of 18 and 50, inclusive, or a woman between the ages of 18 and 40, inclusive, unless he or she is excepted from the provisions of the Control of Engagement Order, 1947, or the vacancy is for employment excepted from the provisions of that Order.

WANTED. Gentleman calling on Gas Companies to represent firm with specialities. On commission. Car essential. Every support. Apply to No. 9726, "GAS JOURNAL," 11, Bolt Court, Fleet Street, London, E.C.4.

FIRST-CLASS REPRESENTATIVE required for North of England and Scotland to market gas appliances for established company. Salary, commission and expenses. Write, giving full details of previous experience, to No. 9725, "GAS JOURNAL," 11, Bolt Court, Fleet Street, London, E.C.4.

A YOUNG ENGINEER—or CHEMIST with some practical engineering experience—is required to assist in gas water heater testing and development. Previous experience in our special line an advantage, but not essential.

Applications, stating age, education, experience, salary expected, to be addressed The Laboratory, EWART & SON, LTD., 35, Kentish Town Road, London, N.W.1.

APPLICATIONS are invited for the appointment of ENGINEERING SALES REPRESENTATIVE for South Wales and the West of England. Applicant with good practical knowledge of gas-works and chemical plant preferred. The appointment provides splendid opportunity for energetic man. Permanent appointment, generous superannuation scheme, car made available. Apply in writing, stating age, experience and salary required to the Personnel Officer, NEWTON CHAMBERS & CO., LTD., Thorncliffe, near Sheffield.

CAPE TOWN—SOUTH AFRICA

WORKS TECHNICAL ASSISTANT.

APPLICATIONS are invited for the position of TECHNICAL ASSISTANT AND DRAUGHTSMAN to the Engineer and General Manager at our Cape Town Works. Inclusive salary £430 per annum. Candidates must be physically fit, good draughtsmen with engineering qualifications and some experience of working and installation of gas-works plant, verticals, C.W.G., &c. Age preferably not over 35.

Passage to Cape Town will be paid by the Company.

Applications must be in writing to the undersigned and accompanied by *copies* of recent Testimonials.

A. BLACKBURN,
Secretary.
Cape Town and District Gas Light and Coke Co., Ltd.,
Africa House,
Kingsway, W.C.2.

BUCKHAVEN AND LEVEN GAS COMMISSIONERS

APPLICATIONS are invited the for position of ASSISTANT ENGINEER AND MANAGER to the Buckhaven and Leven Gas Commissioners.

Applicants should possess the Higher Grade Certificate in Gas Engineering (Manufacture) and have had practical experience in the operation and control of continuous vertical retorts and be competent to supervise the operation and maintenance of works plant in general.

The salary will be in accordance with the National Joint Industrial Council A.P.T. Division, Grade IV, £420, rising to £465, plus cost of living bonus, at present £60 per annum.

A house will be available for the successful candidate.

Applications, stating age, qualifications, experience, &c., together with *copies* of three recent Testimonials, should be lodged with the undersigned not later than Saturday, May 8, 1948.

H. A. AITKEN,
Gas-works, General Manager.
Leven.
April 20, 1948.

EAST HULL GAS COMPANY

HOME SERVICE ADVISOR.

APPLICATIONS are invited for the position of HOME SERVICE ADVISOR at a commencing salary of £300 per annum.

Applicants should hold a recognized qualification in domestic science, be a good organizer, and be capable of demonstrating cookery, laundry and home service subjects.

The applicant appointed will be required to pass a medical examination before the appointment is confirmed and to contribute to the Company's staff pension fund.

Applications, with particulars of age, qualifications and experience, together with *copies* of recent Testimonials, should be forwarded to the undersigned, endorsed "Home Service Advisor," not later than May 12, 1948.

T. W. T. HAMMERTON,
St. Mark Street, Manager and Secretary.
Hull.
May 20, 1948.

CORPORATION OF GREENOCK

SENIOR TECHNICAL ASSISTANT.

APPLICATIONS are invited for the position of SENIOR TECHNICAL ASSISTANT in the Gas Department of the Corporation at a salary in accordance with Grade III of the A.P.T. Division of the National Scales of Salaries of £390, rising to £435 per annum, plus cost of living bonus.

Candidates must be Associate Members of the Institution of Gas Engineers, possessing the Higher Grade Certificate (Gas Manufacture) and have a sound practical experience in the control and operation of modern gas-works plant.

The appointment is subject to the provisions of the Local Government Superannuation (Scotland) Act, 1937, and the person appointed will be required to pass a medical examination.

Applications, stating age, present position, qualifications and experience, together with *copies* of two recent Testimonials, should be lodged with the undersigned not later than Wednesday, May 12, 1948.

A. H. GRAY,
Town Clerk.

THE Liverpool Gas Company invites applications from qualified DRAUGHTSMEN for a position in the Drawing Office of the Distributing Engineer. Applicants should preferably be not more than 28 years of age and should have had experience in mechanical or civil engineering. Some knowledge of underground mains systems would be an advantage.

Remuneration will be in accordance with the Company's established salary scales within the grade £315 to £405 per annum.

The successful applicant will be required to pass the usual pre-employment medical examination and to contribute to the officials' superannuation fund.

Application should be made by letter addressed to the PERSONNEL SUPERINTENDENT 18-26, Bold Street, Liverpool, 1.
April 13, 1948.

An exemption certificate from the Ministry of Labour is held for this advertisement dated April 8, and is valid until June 7, 1948.

BARNSTAPLE GAS COMPANY

WORKS FOREMAN.

APPLICATIONS are invited for the above position. Wages £7 10s. with house and gas Practical experience with control and maintenance of continuous verticals, automatically operated C.W.G. and benzole plants, also control and organisation of labour essential.

Applicants should have had a mechanical training, and be able to supervise the repairs and maintenance of all gas-works plant and machinery.

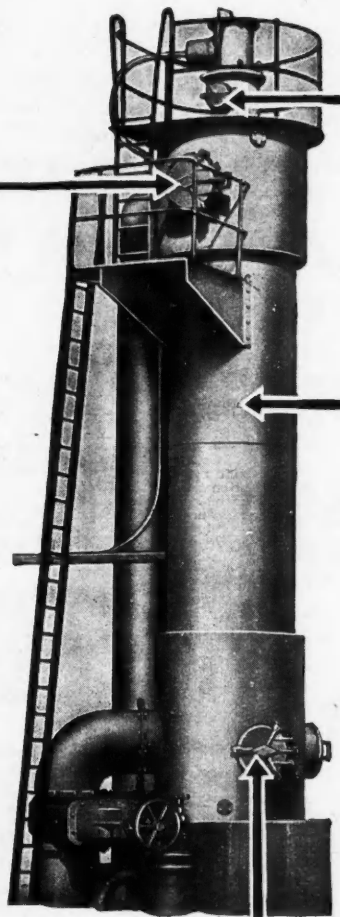
Applications, stating age, present position, training and experience, together with *copies* of two recent Testimonials should be forwarded to MANAGING DIRECTOR, Cross Street, Barnstaple.

This advertisement is published by permission of the Ministry of Labour and National Service under the Control of Engagement Order.

HOLMES ELEX

DETARRERS

SPECIAL FEATURES



Quick opening manholes for ease of inspection (Figs. 1 and 6) fitted with Castell interlocking system (Figs. 3 and 5) ensuring that the manholes cannot be opened until the electrical supply is cut off.

FIG. 1

The patented concentric ring electrodes (Fig. 2) form the ideal construction for electrical detarrers. An exclusive feature in Holmes-Elex design.

FIG. 2

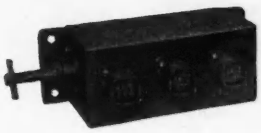


FIG. 3

Completely "Self-Screened" electrical equipment with combined control panel (Fig. 4) ensures absolute protection and prevents interference with radio reception.

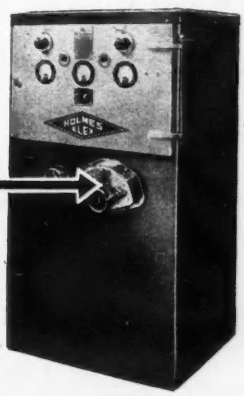


FIG. 4

FIG. 5

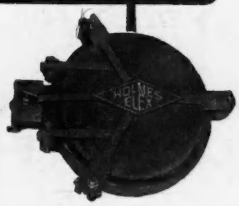


FIG. 6

W. C. HOLMES & CO. LTD. HUDDERSFIELD LONDON BIRMINGHAM

C 272

Every gas furnace using air blast should be fitted with this control!

This control ensures maximum efficiency because it correctly mixes gas and air and maintains correct proportions irrespective of changes in the gas or air pressures. Also, with this control reasonable air pressure only is required, which, if not already available, can be provided by a centrifugal fan. Many thousands in use.

"KEITH BLACKMAN"

TYPE 2 AUTOMATIC GAS & AIR

MIXTURE CONTROL

KEITH BLACKMAN LTD., MILL MEAD ROAD, LONDON, N.17. TN: TOTTENHAM 4522 TA: "KEITHBLAC PHONE LONDON."

Our Services to the Gas Industry comprise

Supply of LANCASHIRE & CORNISH BOILERS
the EXPEDITIOUS REPAIRS to same
in any part of the Country, particularly
REPLACEMENT OF FLUES OR FURNACES.

Supply of RIVETED or WELDED GAS MAINS
or other PLATEWORK.

BUILDING of Boiler Houses, Boiler Setting and
CHIMNEY SHAFTS by our own SPECIAL STAFF.

DANKS OF NETHERTON LIMITED
NETHERTON, DUDLEY, WORCS.
Established 1840.

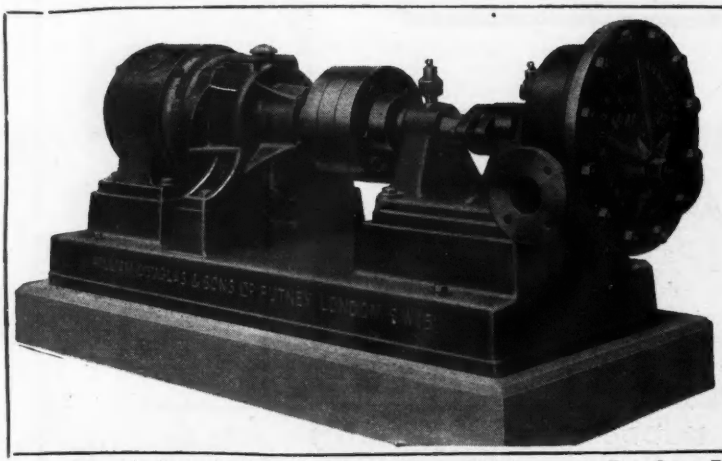
"WASK" HIGH TENSILE MALLEABLE PIPE FITTINGS

OVER 4000 SIZES
INDIVIDUALLY AIR TESTED
STANDARD TAPER THREADS
FULL THICKNESS THROUGHOUT

Fit and forget!

MADE BY THE MAKERS OF—
"Wask" Up and Down Patent Lamp Suspenders, the NON-DISCONNECTING raising and lowering gear.

WALTER SLINGSBY & CO., LTD.
NEW DAM WORKS - - - KEIGHLEY
Phone: Keighley 3749 (2 lines). 'Grams: Malleable Keighley.



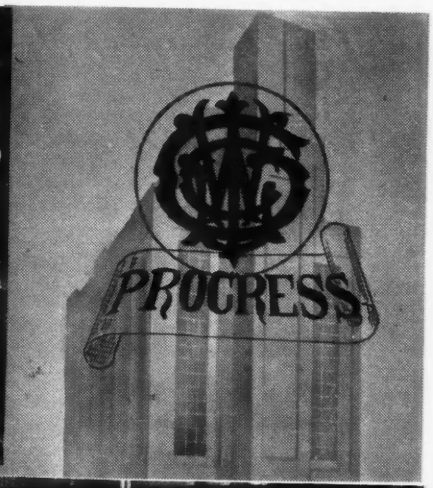
"THE DOUGLAS PUMP"

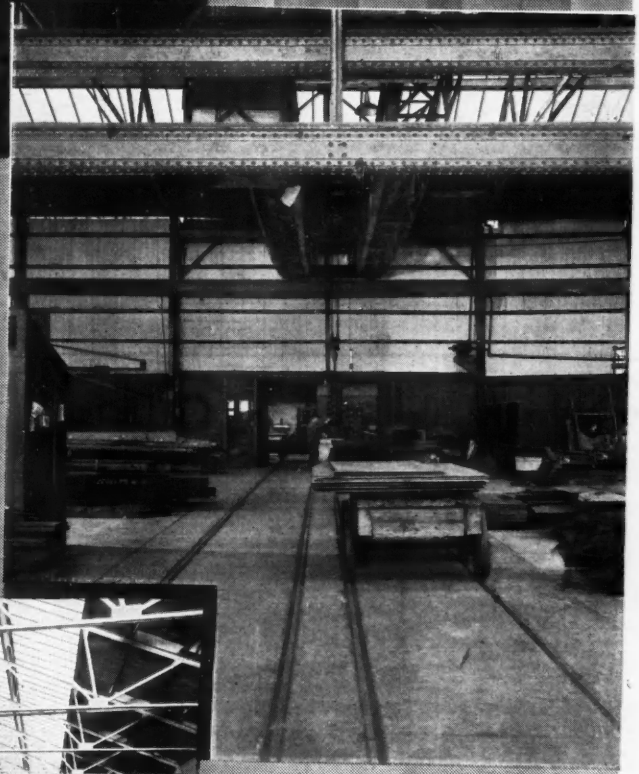
STEAM HEATED FOR TARS.

GOOD SUCTION SLOW SPEED

WILLIAM DOUGLAS & SONS LTD.,
PUTNEY - - LONDON, S.W.15.

Printed by Straker Brothers Ltd., E.C.2, for WALTER KING LIMITED, 11, BOLT COURT, FLEET STREET, LONDON, E.C.4.—Wednesday, April 28, 1948





Structural Steelwork

for

GLOVER-WEST VERTICAL RETORTS

is fabricated in our own shops at

ALBION IRONWORKS MANCHESTER

WEST'S

GAS IMPROVEMENT CO. LTD.

Miles Platting

MANCHESTER 10

Telephone: COLlyhurst 2961-2-3-4-5

Telegrams: Stoker, Manchester

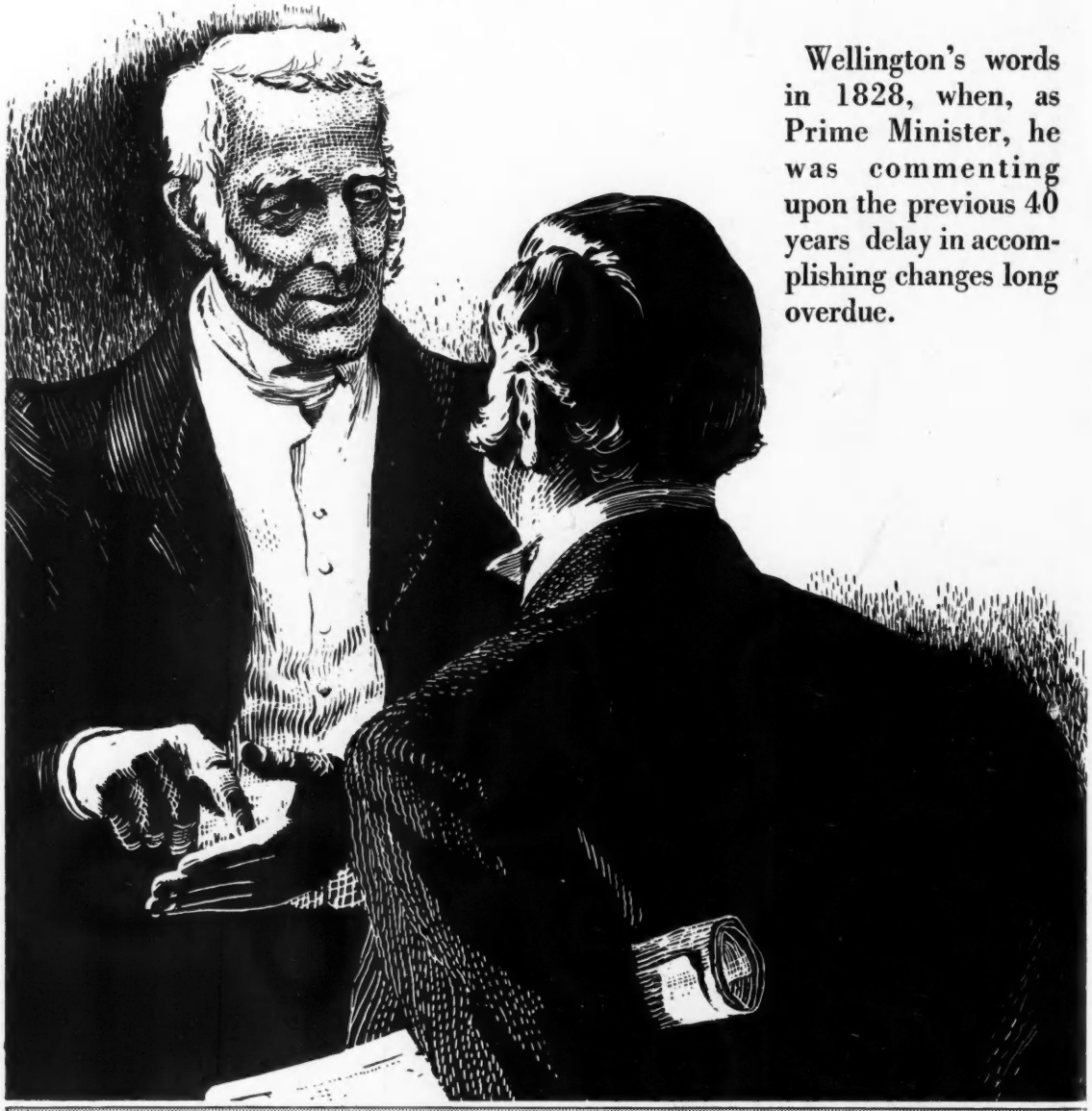
London Office:

COLUMBIA HOUSE, ALDWYCH, W.C.2

Telephone: HOLborn 4108-9

Telegrams: Weogasco, Estrand

"We have a duty imposed upon us which was never thrown upon our predecessors"



Wellington's words in 1828, when, as Prime Minister, he was commenting upon the previous 40 years delay in accomplishing changes long overdue.

WELLINGTON TUBE WORKS LTD

FOR STEEL TUBES AND STEEL TUBE FABRICATION

HEAD OFFICE & WORKS · GREAT BRIDGE · TIPTON · STAFFS